ALTERNATIVE FINANCING PLAN FOR THE CLINCH RIVER BREEDER REACTOR PROJECT

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY RESEARCH AND PRODUCTION

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

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ALTERNATIVE FINANCING PLAN FOR THE CLINCH RIVER BREEDER REACTOR PROJECT

THURSDAY, SEPTEMBER 15, 1983

House of Representatives,
Committee on Science and Technology,
Subcommittee on Energy Research and Production,
Washington, D.C.

The subcommittee met, pursuant to call, at 9 a.m., in room 2318, Rayburn House Office Building, Hon. Marilyn Lloyd (chairwoman of the subcommittee) presiding.

Mrs. Lloyd. The subcommittee will come to order.

Before we begin our hearings, I do ask unanimous consent that the subcommittee permit today's proceedings to be recorded and covered by the media and other persons. Without objection, so ordered.

Good morning, ladies and gentlemen. Today we will be considering the administration's proposed aternative financing plan for the Clinch River breeder reactor. This is the plan submitted to Congress by the Department of Energy in response to a directive by the conferees to the Further Continuing Appropriations Act of 1983, Public Law 97-377, and delineated in the conference report, House Report 97-980, that accompanied that bill.

First, I would like to make some remarks about the manner in which the subcommittee will proceed today. Many of my colleagues and I will be attending services for our late colleague, Larry McDonald from Georgia, who unfortunatly was aboard the Korean Air Line plane that was shot down by the Soviet Union. I do, therefore, expect to adjourn this hearing by 4 p.m. today, but the committee will go straight through without a break for lunch.

All members of the subcommittee will be provided an opportunity to make an oral opening statement. Because our time will be limited, other members of the committee who have opening statements may be unanimous—by unanimous consent, have them included in the hearing record.

We have 15 witnesses appearing before us today, so our time will have to be parceled out carefully to insure that all of our witnesses can testify and members will have an opportunity to question them. I will apply the following ground rules which I believe are fair and, at the same time, recognize the privileges of the subcommittee members.

All of our witnesses will be limited to a 10-minute summary of their prepared statement, except the Secretary, who will be given 20 minutes. And this will be monitored by our time clock. We will prorate time for oral questions among the members of the committee, one round of questioning limited to 5 minutes for each member, with members of the subcommittee—this subcommittee to be recognized first, then members of the full committee all in order of their appearance. All members will be provided the opportunity to submit written questions for the record to any witness. The time for questioning will be 90 minutes total for the first six witnesses, an hour for the first panel and 30 minutes each for our French guest and the remaining two panels. We also have some slight changes in the witness order. Our colleagues, Mr. Wolpe and Mr. Morrison have graciously consented to appear as a House panel, and we shall defer questions until both of them have testified. Mr. Barre will appear after the first panel rather than at the end of the hearing.

Mrs. SCHNEIDER. Would the gentlewoman yield for a question?

Mrs. LLOYD. When I have completed my statement.

Mrs. SCHNEIDER. Sure.

Mrs. LLOYD. Essentially, the Department was to propose alternatives to the original Government-industry cost-sharing arrangement that would reduce the Federal budget requirements necessary to complete the Clinch River project.

There are compelling arguments for completing the CRBR project, and I believe two arguments put forth by Dr. Alvin Weinberg are really worth repeating this morning.

He stated,

> There is a . . . powerful argument for completing CRBR, an argument that unfortunately has been ignored in this debate. Breeder reactors, as well as most other inexhaustibles, are high capital cost, low operating costs devices. In this respect they resemble dams which utilize a form of solar energy. Conventional accounting practices for estimating costs of power are derived mostly from experience with relatively short-lived fossil-fueled plants which have high, and not low, operating costs. Thus, our economic horizon in judging costs is about 30 years. And yet, dams last very much longer than 30 years. That reactors share this attribute with dams is attested by the 27-year-old Calder Hall non-breeder reactors in England, which are expected to operate for many, many more decades. They are now, and will continue to be, producing England's cheapest electricity.
>
> Now the only way we can tell whether breeders will last, say, 75 or 100 years, rather than 30 years, is to build some breeders now, and then to operate them for a very long time. And building and operating CRBR is crucially important in determining the longevity of breeders. And should CRBR be running well 30 years from now—which I consider entirely probable—it will be producing electricity at about half the cost of competing fossil-fueled plants. And I should think that once this possibility of extreme longevity is realized, the economic pressure to convert to nuclear power will very great. But we will not be able to make this judgment unless we have experience—tedious, lengthy and expensive—with breeder reactors.

The plan that we will be discussing today is the culmination of several months of extremely hard work on the part of both the Department and an industry task force assembled by the Breeder Reactor Corporation. It represents a singularly unique undertaking in the annals of Federal R&D project financing arrangements. And if implemented, 40 percent of the remaining project costruction costs would be covered by private capital. And this amounts to $1 billion.

This plan is based upon the sale of future plant assets, principally the revenues derived from the sale of electricity produced by the plants, as the means for raising the necessary capital in private financial markets.

Now today we are going to be hearing testimony from those representing all viewpoints on the Clinch River project. Our witnesses include distinguished Members from both Houses of Congress, the Department of Energy, investment firms, industry, special interest groups and others will, again, use this forum to once again express their views on this oft-discussed project. And I think it is inevitable that we are going to revisit some of the technical and some of the economic features of this project. But I would note, however, that our main purpose here today is to discuss the contents of the administration's proposed alternative financial plan.

Principally at issue here today is whether or not the administration's plan to finance the completion of the Clinch River reactor is workable, and whether or not it does meet congressional directives.

I would like now to recognize my colleague, Mr. Winn, the ranking member of our full committee, for his opening comments.

Mr. **Winn**. Thank you, Madam Chairman, for this opportunity to welcome our witnesses today and to comment on the substance of this hearing. It is both timely and necessary to discuss the administration's alternative financing plan for the Clinch River breeder reactor project.

My long-time continuing support for this project is well known. During periods in which there was both strong opposition and equally strong recommendations for the breeder reactor concept, I have advocated the funding for research and development to define and utilize this important energy source.

For a number of reasons during this research and development period, we have seen estimated costs for the Clinch River project escalate by a significant amount. My concern for this cost increase is shared by other members to the extent that the administration has been asked to review the project and to propose alternative financing to the Congress. As Members of the Congress, our fiscal responsibility requires that we relieve the Federal budget from as many strains as possible.

We've been advised that the private sector has evaluated the Clinch River project at great length. This evaluation, in turn, has led to a proposal provided to the administration which, in turn, has been brought to the Congress. We have now reached the point where we can take a hard look at this proposal and make a judgment on the future action. I believe that we must now make a final decision and commitment on this project.

Madam Chairman, you have selected witnesses who represent a broad variety of opinions voiced on the Clinch River breeder project—breeder reactor, and probably on the administration's alternative financing plan. Certinly your subcommittee provides a necessary forum to review this funding plan and the differences of opinion which evolve from that plan.

Again, Madam Chairman, I believe that today's activity will be beneficial to all of us. And I thank you.

Mrs. **Lloyd**. Thank you very much, Mr. Winn.

We will recognize Mr. Walker, who is the ranking minority member of this subcommittee. Mr. Walker.

Mr. **Walker**. I thank you, Madam Chairman.

This opens the final act on the continuing saga of the Clinch River breeder reactor. Today we will examine the alternative financing plan which was developed to meet the prior congressional opposition to the Government liability which was so rapidly escalating as costs for the CRBR went up.

This plan does take part of the financing burden off the budget through an imaginative financing plan, which we will hear about today. If this will be sufficient to satisfy congressional criticism on that score remains to be seen. It does appear that this plan does not satisfy criticism that the taxpayers bear all of the risk and all of the exposure.

My own concerns are that this single project is now claiming a disproportionate share of our total energy research budget. My concerns were further fueled this week when it was reported in the Trade Press that substantial and probably catastrophic cuts were being contemplated in the breeder base program if Congress approves the continuation of CRBR. I have been unable to determine if these cuts are actually being contemplated or merely the latest illusion of the Washington monument budget brinkmanship's—brinkmanship's gamut, but the cuts which are proposed are clearly unacceptable to the Congress, so that we will be forced to add money to the budget. If the cuts are real, it bodies very badly for the breeder program overall. And if they are brinkmanship, I cannot understand the timing which clearly endangers the vote on CRBR.

Finally, Madam Chairman, I must express my frustration at the fact that I have been attempting for weeks to determine what the President's position is on this plan. Over the past few years, there have been conflicting signals within this administration on support for CRBR. I find it ironic that, even at this late date, it is impossible for me, for as I know any other member of this committee, to tell you that the President has shared his position on this issue with us directly.

Madam Chairman, I want to see a full and fair hearing today. I do not know how I will vote on this plan when we get down to that final vote, but I must say I'm still concerned that sufficient information be presented that will convince me to support the financing plan.

Mrs. Lloyd. Thank you very much, Mr. Walker.

Are there any more opening statements from members of the full committee—of this subcommittee?

Mrs. Schneider, I yield for a question.

Mrs. Schneider. Yes. I merely had a question.

I wanted to commend the—my colleague for setting up a time schedule and starting this hearing on time so very efficiently. But it has come to my attention that Mr. Hodel has some time constraints, and I just wanted to verify that, if, Mr. Hodel, you have to be out of here at a certain time; is that true?

Secretary Hodel. I will be happy to satisfy the committee by staying here as long as your schedule permits.

Mrs. Schneider. Thank you. Thank you very kindly.

Mrs. Lloyd. Thank you very much, Mrs. Schneider.

Our first witness today is the Honorable Donald Paul Hodel, our Secretary of Energy. We certainly welcome you, Mr. Secretary. Please proceed with your statement.

STATEMENT OF HON. DONALD PAUL HODEL, SECRETARY OF ENERGY

Secretary HODEL. Madam Chairman—Madam Chairman, aware as I am of the time constraints on the committee, I would like to try to summarize my written statement which I have submitted and would like to submit for the record.

First——

Mrs. LLOYD. Without objection, your statement will be made a part of the record, your complete statement.

Secretary HODEL. Thank you.

First, I would start by echoing the comments you made, Madam Chairman, regarding the importance of Clinch River breeder reactor, and simply emphasize that, as far as we can tell, everything we know indicates that it is a key and intermediate step in the scaling up of this technology. And the Clinch River project is, in fact, the focus of the breeder program. And, perhaps unfortunately, but I think absolutely accurately, it has become symbolic of the commitment of this Nation to a breeder reactor program. That is true not only domestically, but internationally as well.

There are major uncertainties that have to be acknowledged at this time as to whether and what electrical load growth will be in this country, and how rapid will be the deployment of light-water reactors, and what the size of our resource base must be.

The breeder reactor program, in that regard, would appear to be an insurance policy. It provides us with real assurance that if we move as, I think the Chairman you have indicated we should, and I would agree, so that nuclear power can remain a viable portion, a viable component of a mixed energy system in this country, then the breeder reactor becomes increasingly important.

We have invested 30 years time in this technology. We are on the road to what is essentially an inexhaustible resource, and it appears to us that we ought to complete this project where we have invested so much money to date.

I am intrigued by Congressman Walker's reference to a desire for some presidential indication as to support. And I am prepared to try to remedy that we promptly as possible upon——

Mrs. LLOYD. Mr. Secretary, may I have just 1 minute?

Secretary HODEL. Yes.

Mrs. LLOYD. I think it would be wise if we could have a little more—a little more quiet atmosphere in this chamber so that we certainly can hear you.

Please proceed, Mr. Secretary.

Secretary HODEL. The President has been unequivocal in his support for this project. And if it has not been communicated to the members of this committee, then that's a failure on our part to see to it that that has been known.

I think it's important for me to try to describe briefly the alternative financing plan which has been made available to the committee. The central concept of this plan is to market the commercial value of the plant. The power which will be produced by this plant over a 30-year period has a significant future value. We would proposed to market that to investors who will invest their money now and, during the construction phase, make available to us funds equal to 40 percent of the cost of completion of this project. This would have the immediate effect of reducing Federal outlays.

And the—and that—and the—one of the questions that remains is what the future value of the power will be. By our conservative estimates, we would assume that it would be more than sufficient to meet the obligations of debt service plus interest. If there's excess revenues because of increased power values down the road, the Government would share in those values and further reduce its investment.

Now in order for us to attract investment in this project, which is federally designed, federally constructed, will be federally operated, will be subject to the Federal licensing process, it is necessary that we provide certain guarantees and warrantees. Therefore, it is essential, if we are to obtain this kind of investment, that we provide some some—some assurances that the projects will operate and that they will be—that the project will operate, that it will be licenseable, and that power can be marketed from the project. But these, in our estimation, are not high risks on the part of the Government, in view of the proposal which we have.

Now the—the funding proposal breaks down this way. Our total projected cost for the project is now—to complete the project is $2.4 billion. We have a contingency amount of $100 million, which brings us to a $2.5 billion completion estimate. The new appropriations which we would propose would be $1.5 billion, and $1 billion, or 40 percent of these completion costs, we would propose come from private funding.

The private funding would be proposed to be raised by a borrowing of a sufficient sum of money which would be in the neighborhood of $1 billion, from which interest during construction charges would be deducted immediately, and a balance of $675 million would be made available to us for contribution to the project, plus the $175 million which has been pledged by utilities but which we have not been able to be obtained because of the uncertainties about the ability of the Government to complete this project, plus an additional $150 million of equity investment which would be added to these totals and bring us to the $1 billion estimate.

What makes this possible is the electricity value from the project which could be sold outside the TVA grid. I need to comment on that briefly.

Under our present arrangement, we are obliged and prepared to offer the power to the Tennessee Valley Authority pursuant to an agreement. The problem is their forecasts presently indicate that they are not going to be in need of additional power in the timeframe we're talking about. That makes the value of our power to them very marginal at best.

The proposal we have would permit the investor group to wheel the power through the TVA system and sell it to utilities outside the area, and we have received very significant indications of interest on utilities outside the area.

We have tried to be sensitive in examining this plan. And I would remind the committee that when we first heard of the initial concepts that were set forth by the Corey committee, we did not rush to judgment, we did not jump to the conclusion that this was a great idea, but we insisted that we take some time and look at it and analyze it, and we have spent enormous amount of time and effort to do that. In order to determine whether or not it was a workable project, we tried to be sensitive to what the consequences would be to the Federal revenues. And we are—we are satisfied from our analysis that this has—this has a net benefit to us from not having us put up this capital at the early stages of the project.

Now there's a significant question that comes up immediately when we start talking about cost estimates, and I must deal with that. The cost of this project has grown enormously since it was first estimated in 1972. That is not unique to the Clinch River project. It is common to large projects between 1972 and 1982-83.

The policy debate and the arguments about this project have had a significant impact on our ability to move forward with it. The uncertainty of financing, the 5-year policy debate that has gone forward, has resulted in essentially marginal funding or insufficient funding, which has helped create the very problem that is now being used as a reason for not completing the project, which is the costs have gotten out of hand.

Even in a static environment over this period of time with what has happened to construction's cost, it would not be unreasonable to expect that there would have been escalating costs.

Now, we asked for in January an independent cost estimate to be made of this project. I am aware of some current comments about an earlier estimate which I was not aware of, which is—was done by the same independent cost estimating unit of the Department, which has been incorporated, I am advised, into the estimate that I have—that my staff asked for during the spring.

There were differences of view between the various estimates, which is not unusual or unexpected. But I am assured now that all key issues have been resolved and that the residual issues that remain do not significantly affect the cost estimate. Which, as a result, I have considerable confidence that the $2.5 billion estimate which I have talked about is a reasonable and a prudent estimate, and there are a number of reasons for saying that. And we are prepared, Madam Chairman, to submit to the committee a detailed documentation of the cost estimate work which has been done.

Mrs. LLOYD. Without objection, it will be made a part of the record of this hearing.

Secretary HODEL. Thank you.

[The information follows:]

ASSESSMENT OF THE COST TO COMPLETE
THE CLINCH RIVER BREEDER REACTOR PLANT PROJECT

SEPTEMBER 14, 1983

A REPORT TO THE SECRETARY

Prepared by:
The Assistant Secretary
for Nuclear Energy
U.S. Department of Energy

ASSESSMENT OF THE COST TO COMPLETE THE CLINCH RIVER BREEDER REACTOR PLANT PROJECT

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B - Memorandum, C. N. Mitchell to the Special Assistant to the Secretary, dated April 11, 1983, subject "Clinch River Breeder Reactor Project Cost Estimate and Schedule Reconciliation"

C - Memorandum, Shelby T. Brewer to Earl Gjelde, dated April 12, 1983, subject "Clinch River Breeder Reactor Plant (CRBRP) Project Schedule"

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ASSESSMENT OF THE COST TO COMPLETE THE CLINCH RIVER BREEDER REACTOR PLANT PROJECT

I. SUMMARY AND CONCLUSIONS

This report is in response to your request of August 19, 1983 (Attachment A).

I am in total accord with your view that the Department's representation of the estimated cost-to-go on the CRBRP be as accurate, candid, and credible as possible. This is particularly important given the upcoming consideration of the Alternative Financing Plan (AFP) by Congress and the exposure of the U.S. Government under the AFP arising from (1) any potential cost overrun or (2) obligations of the U.S. Government should the Project be terminated before power operations commence. Morever, I believe it is necessary for the Deparment to take a clear position on the project costs. This report is intended to support such a position.

I have carefully evaluated the major factors bearing on the cost estimate and incorporated an assessment based on a detailed bottoms-up analysis currently underway. This analysis resulted in some adjustments to the cost and schedule estimate utilized in the March 1983 report to Congress on CRBRP Alternative Financing. The change increased the cost by $41 million and slipped the schedule 3 months due to delayed availability of funding to arrive at the "current assessment."

A number of factors identified by the ICE review of CRBRP cost and schedule bear on the validity of this current assessment. We have carefully reviewed each issue and held extensive discussions with ICE. I believe there is a clear understanding of the differences which remain. They reflect differences in judgment. By normal standards, these differences are small when compared to the total remaining cost to complete the project. After having carefully evaluated the ICE information, I conclude that my current assessment as described herein is the appropriate cost and schedule for Clinch River. The current assessment if $2.381 billion which includes $216 million in contingency; project duration from start of construction to start of power operations is 88 months.

While I am confident that we can achieve this cost and schedule if the major assumptions are met, I believe the ICE concerns are in the areas most sensitive to possible increases in cost and schedule. Accordingly, we have evaluated the potential impact of a 15-month schedule slip beyond our current assessment and the ability of such a slip to be accommodated within the Alternative Financing Plan as proposed. We have reached agreement with ICE on a cost and schedule margin that accounts for their differences with our current assessment and that this Departmental margin should be included for purposes of the Alternative Financing Plan. The results of our analysis show that a slip in the CRBRP schedule of 15 months can be accommodated within the $2.5 billion remaining cost identified in the Alternative Financing Plan.

II. EVOLUTION OF THE CRBRP PROJECT OFFICE COST ESTIMATE

The CRBRP Project Office cost estimate over the years has evolved in response to a series of annual budget insufficiencies (resulting from chronic but inconclusive policy debates), and regulatory impacts, as well as internally generated design changes. It is instructive, and necessary to the credibility of the estimate, to trace the evolution of the estimate over the past year with particular attention to any differences between assumptions in the March 15, 1983, Report to Congress and the present, and their impact, if any, on the general terms and parameters of the Alternative Financing Plan (AFP). Table 1 summarizes the estimates.

A. The 1982 "Bottoms-Up" Estimate - Criticality September 30, 1988

The 1982 "Bottoms-Up" estimate of $3.4 billion consisted of a $3.715 billion cost to complete offset by $350 million in net revenues during the demonstration phase. It was a detailed estimate with input from the Project's principal contractors which was negotiated with and concurred in by them. Controlling assumptions were:

- With NRC approval, start site work April 1, 1982.
- FY 83 and FY 84 funding levels sufficient to support the schedule. (See Table 1)
- Use rolling 4x10's construction approach with resulting shortened schedule.

The resultant criticality was September 30, 1988.

B. Assessment of 1982 "Bottoms-Up" for One Year Delay - October 1982 Criticality September 30, 1989

The NRC approval to begin site work was not received in April and a 1-year delay was assumed. An assessment (rather than a new Bottoms-Up cost estimate) of a one-year delay to the previous schedule was developed. This approach assumed that $227 million would be appropriated by Congress for the Project in 1983.

C. March 1983 Assessment Submittal with BRC Task Force Report to Congress - March 1983 Assessment - Criticality October 31, 1989

The CRBR Project Office assessment of October 1982 (B) was revised and provided to Congress when the Department forwarded the Breeder Reactor Corporation (BRC) Task Force Report in March 1983. The BRC Task Force Report set forth a concept for supplementing Federal appropriations with private financing, The Alternative Financing Plan (AFP). (See Section E.)

Instead of the $227 million requested, Congress appropriated only $194 million for FY 1983 which was a continuation of the FY 1982 funding level. The FY 1983 Continuing Resolution contained

TABLE 1

EVOLUTION OF CRBRP ESTIMATE
SINCE THE PREVIOUS "BOTTOMS-UP"
ESTIMATE OF 1982

	1982 BASE		OCTOBER 1982		ALT. FIN'G. PLAN MARCH 1983[1]		CURRENT ASSESSMENT[2]	
	DATE	MONTHS						
NRC AUTHORIZE SITE WORK	3/31/82		8/5/82		8/5/82		8/5/82	
START SITE WORK	4/1/82	14	9/22/82	14	9/22/83	14	9/22/83	14
START CONSTRUCTION	6/1/83	50	12/1/83	56	12/1/83	57	12/1/83	60
START SODIUM TESTING	8/1/87	11	8/1/88	11	9/1/88	11	12/1/88	11
START CONTINGENCY	7/1/88	3	7/1/89	3	8/1/89	3	11/1/89	3
INITIAL CRITICALITY	9/30/88	78	9/30/89	84	10/31/89	85	1/31/90	88
FY 83 BUDGET AUTHORITY		\$353 M		\$227 M		\$194 M		\$194 M
FY 84 BUDGET AUTHORITY		\$523 M		\$370 M		\$270 M		\$270 M
COSTS TO GO (FY 84 TO START OF COMMERCIAL OPERATIONS)		\$1.951B[3]		\$2.351B[4]		\$2.385B		\$2.426B[5]

1. Assumed Appropriated Funds and Alternative Finance Plan Funds available October 1, 1983.
2. Assumed Appropriated Funds available October 1, 1983 and Alternative Finance Plan Funds available April 1, 1984.
3. TPCE Reported as \$3.36B net of revenues projected for 5-year demonstration phase.
4. TPCE Reported as \$3.6B net of revenues projected for 5-year demonstration phase.
5. \$2.426 billion - \$45 million (carryover) = \$2.381 billion.

restrictive language in the Conference Report which did not permit advancing the completion date. The March 1983 cost assessment and schedule was based on adequate Federal and private funds becoming available to the Project by October 1, 1983. The construction effort, commencing at the start of FY 1984, could then proceed on a schedule unrestrained by funding availability. For this and future assessments the Department focused on cost to complete and has not included net revenues during the demonstration phase, except for $33.7 million during startup.

D. Current Assessment - Criticality January 28, 1990

The Alternative Financing Plan was not approved in May 1983, as had been assumed, and adequate funding will not be available on October 1, 1983. At my direction, the Project has undertaken a revised "bottoms-up" estimate assuming unrestrained funding available on April 1, 1984, and an FY 1984 appropriation level of $270 million available on October 1, 1983. (The spending rate for the first-half of FY 1984 would be at one-half of the $270 million.) The costs are based on an 88-month schedule. The current assessment is based on this evaluation. The current estimate and relationship to the March 1983 assessment is described in more detail in Section III.

E. BRC Task Force Alternative Financing Plan - March 1983/June 1983

The Conference Report associated with the Further Continuing Appropriations Act of FY 1983 required DOE to explore alternatives for securing additional private sector financing for the Project to reduce Federal budget requirements. In March 1983 the Department forwarded a "Report to the Congress on Alternative Financing of the Clinch River Breeder Reactor Plant Project." The financial concept was developed by a private sector task force organized under the auspices of the Breeder Reactor Corporation. The task force included representatives of investment banking firms and utilities. The AFP focused on the funding to complete the Plant and bring it to commercial operation. Table 2 is the summary of the capital costs that was included in the March report, indicating a requirement for $2.38 billion of funds (in year of expenditure dollars) to complete the Project. This amount was rounded up to $2.4 billion by the BRC Task Force.

In June 1983 the BRC Task Force forwarded to the Secretary a further developed version of the Alternative Financing Plan. The Plan illustrates how $1 billion of private sector financing could be made available for completion of the Project. This revised plan incorporated a startup contingency of $100 million in the proposed plan. The Plan is the basis for draft legislation formulated by Congressional committees which would provide a one-time appropriation of $1.5 billion which, with the private financing, would provide a total of $2.5 billion for completion of the Project.

On July 21, 1983, senior executives of industry, the utilities, labor, and the investment community and others met with President Reagan, Counsellor Meese, and Secretary Hodel. The President endorsed completion of the Clinch River Breeder Reactor Project

TABLE 2

CRBRP CAPITAL COST ESTIMATE TO COMPLETE CONSTRUCTION
IN MILLIONS OF YEAR OF EXPENDITURE DOLLARS
1989 CRITICALITY

	FY 84	FY 85	FY 86	FY 87	FY 88	FY 89	FY 90	TOTAL FY 84 THRU MAY 1990
RM ENGR/MGMT	78.7	57.3	28.0	16.4	13.4	11.1	2.6	207.5
RM HARDWARE	123.7	145.1	74.6	16.8	1.7	0.8		362.7
AE ENGR/MGMT	26.5	25.1	11.4	8.5	7.4	7.9	1.9	88.7
AE HARDWARE	23.0	86.4	45.9	8.7	0.1			164.1
CONSTRUCTION (CN)	143.6	233.3	317.3	200.0	121.8	(13.9)		1,002.1
CN CONTINGENCY	12.9	25.9	23.2	18.5	9.5			90.0
LABS	0.1	0.1						0.2
FUEL/SNM	2.9	10.3	29.0	36.8	25.9	42.2	39.7	186.8
FUEL CONTINGENCY	0.3	0.9	3.6	5.6	10.6	8.4	7.9	37.3
PROJECT OFFICE	13.0	12.0	11.9	12.3	12.7	12.4	7.3	81.6
OPNS/MAINT (O&M)	0.8	6.0	11.4	14.0	20.1	29.3	27.9	109.5
REVENUE							(33.7)	(33.7)
OTHER CONTINGENCY	10.2	20.5	15.5	13.0	11.3	9.1	9.0	88.6
	435.7	622.9	571.8	350.6	234.5	107.3	62.6	2,385.4
TOTAL FUNDS REQUIRED[1]	499.0	656.9	516.6	321.5	202.7	96.1	47.0	2,339.8
UTIL CONTRIB[2]	20.7	23.8	23.8	22.8	21.0	21.0	39.0	172.1
OTHER CONTRIB	1.4	0.2	0.2	0.2			2.5	4.5
NET FUNDS REQUIRED	476.9	632.9	492.6	298.5	181.7	75.1	5.5	2,163.2

[1] Total Costs of $2,385.4 minus funds available to start FY 84 of $45.6 = $2,339.8 funds required.
[2] Assumes utilization of all utility contributions prior to commercial operations.

and pledged administration support for the Alternative Financing Plan.

III. CURRENT PROJECT COST ESTIMATE BASELINE DEVELOPMENT

A. General

The Project has prepared a revised assessment of the project cost which reflects several changes in the baseline from March 1983:

- The March 1983 estimate assumed availability of private funds in October 1983. Since that will not happen, the current assessment assumes private funds would be available on April 1, 1984, and an associated slip of 3 months in the overall construction schedule with the associated escalation.
- Rebar quantity increases.
- Increased cost of the rolling 4x10's.
- Stretch of manpower and associated escalation.
- Fee adjustments for award fee conversions.
- Revised escalation rate.

The cost impacts are summarized in Table 3. The assumptions are summarized in Section VI.B.1. A description of the changes is included below.

1. Rebar Quantity Increases

As a result of the Project's cost estimate review process, the Architect Engineer's (AE) rebar quantities which had been developed on a factoring basis were reevaluated on the basis of detailed take-off from the drawings. The ensuing detailed take-off led to an increase of 20 thousand tons in the amount of reinforcing steel and other adjustments in associated material. The AE, Project Office, and constructor were directed to review all other material take-offs for similar adjustment and none were found. The added material cost was estimated at $12 million. The installation cost was estimated at $10 million and the added work amounted to an extension in the schedule with an associated cost of $15 million.

2. Increased Cost of Rolling 4x10's

The rolling 4x10's concept had been factored into previous estimates along with its cost advantages. In preparing the current assessment, the cost was determined on a detailed basis. This detailed assessment identified added costs associated with maintaining management, technical support and administration to support the seven-day operation of the rolling 4x10's.

TABLE 3

CHANGES IN CURRENT ASSESSMENT FROM COSTS IN MARCH 1983 ALTERNATIVE FINANCING PLAN REPORT

	Costs[1]
o Escalation due to 3 months added construction time (full funding not available on Oct. 1, 1983, but on April 1, 1984)	$ 16M
o Stretch of fixed manpower and associated escalation over 3 month extension	28M
o Rebar Quantity Increases	
- Material	12M
- Installation	10M
- Schedule Extension	15M
o Increased cost of rolling 4x10's	46M
o Fee adjustments for award fee conversions	18M
o Escalation Adjustment to 6.5 percent	-105M
	$ 41M

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[1] At an escalation rate of 8 percent.

Additionally, hourly personnel are paid time and one-half for the two hours above eight hours a day, as well as time and one-half for Sunday work. The detailed analysis associated with this detailed estimate resulted in an overall increase in the cost of the rolling 4x10's concept of $46 million. The benefits of the concept still outweigh the added cost.

3. Escalation and Stretch of Manpower for 3 Months

The management and administrative forces will be required to cover the added schedular period and, additionally, the effort will be extended 3 months and must be escalated on that basis. This represents a fixed cost extending over an additional 3 month period. The cost of these factors is estimated at $28 million.

4. Incentive Fee Adjustments

To provide greater performance incentives, the Architect Engineer and Nuclear Steam Supply System contracts have been converted to a Cost-Plus-Award-Fee (CPAF) basis and all outstanding claims have been settled (unresolved claims had accrued during the five years that the construction of the Project had been stopped by the previous Administration). The conversion to a CPAF basis provides the opportunity for directing the contractors toward cost, schedule, and quality improvements and for the contractors to earn additional fee through attaining goals established by the Project while poor performance will reduce this fee.

B. Comparison of the Cost and Schedule Data for the March 1983 Alternative Financing Plan and the Current Assessment

Table 4 contains the comparison of the cost and schedule data for the March 1983 Alternative Financing Plan and the current assessment. Note that the costs are established on the current schedule for completion of the Project and obtaining commercial power on August 31, 1990, and do not include an additional time period for schedule margin discussed in Section V or the associated costs. The current estimate of $2.381 billion (including $216 million for contingency) to finish is within the $2.4 billion envisioned in the Alternative Financing Plan to complete construction.

C. Reasons for Confidence in the Project Baseline Cost/Schedule Estimate

1. The Current Status of the Project

- Design - 92 percent complete. (Typically at construction permit stage a reactor plant is approximately 25% complete.). Engineering support to construction and to test and startup will be provided.

TABLE 4

COMPARISON OF COST AND SCHEDULE DATA FOR THE MARCH 1983 ALTERNATIVE FINANCING PLAN AND THE CURRENT ASSESSMENT

	MARCH AFP	CURRENT ASSESSMENT
ESCALATION RATE	8%	6.5%[2]
ALTERNATIVE FINANCING PLAN FUNDS AVAILABLE	10/1/83	4/1/84
TIME SPAN CONSTRUCTION TO START OF TEST	57 Months	60 Months
CRITICALITY	10/31/89	1/31/90
COMMERCIAL POWER[1]	5/31/90	8/31/90
COST TO GO (FY 84 THRU ATTAINING COMMERCIAL POWER)[1]	$ 2.385 B	$ 2.426 B
FUNDS REQUIRED (COST TO GO MINUS PRIOR YEAR UNCOSTED OBLIGATION)	$ 2.340 B	$ 2.381 B

1. Does not include 15-month Departmental margin.
2. An escalation rate derived from data provided by ICE Team based on Data Resources Inc. projection.

- Procurement - 71 percent of the equipment is on order and half of that is delivered. Most of the CRBRP unique equipment has been ordered and much delivered. Most of the remaining procurements are essentially off-the-shelf or commercially standard equipment with shorter lead times and more established prices. This results in high confidence in the equipment cost estimates and minimizes the amount of field changes necessary to install equipment.
- Research and development - 98 percent complete.
- Extensive prototype testing of critical components is virtually complete. All equipment tested to date has met or exceeded its performance requirements.
- The constructor has been on board for over seven years enabling detailed interaction between the constructor and the designers forming a sound construction planning basis for the Project.
- Licensing is proceeding well and will support the construction program, and is no longer the critical path item.
- Site preparation is 70 percent complete, and work on the Nuclear Island excavation is ahead of schedule and virtually complete.
- The concrete batch plant is in place and qualified. Materials and equipment required to initiate safety-related work are on site or on order.
- Detailed planning is in place for operation and maintenance manual preparation and for pre-op and startup testing.
- The major design contractors have been working together on the Project for over ten years.
- The integrated Project Office has been functioning for eight years and is staffed by experienced personnel from the utilities (Commomwealth Edison, TVA, and others); Project Management Corporation (the utilities' operating arm for the Project); and by the Department of Energy.
- The Project has a very detailed construction model built by the AE which should eliminate most interferences and make solving any that might occur easier. It will be moved to the field and be an active tool for the constructor.

- Cost to complete has recently been negotiated in CPAF contracts with the design contractors and will be the basis for the current baseline estimate when it is complete.

- The construction estimate is very detailed and has a check and balance in that the constructor reviews the AE's construction-related cost and schedule data.

- The Project has sound configuration management procedures to control changes.

- Bid data over the past 18 months has shown a trend for bids to be significantly under the estimates (see Section VI.A.4.).

- The Project will be constructed under a special labor-management agreement known as the Nuclear Power Construction Stabilization Agreement which calls for no lockouts or strikes and has other positive factors to improve productivity. Wage rates are based on local bargaining as long as they are reasonable.

- Productivity in the construction area is high and there is an available trained work force which has recently been engaged in constructing TVA nuclear plants.

- Construction progress has been excellent to date.

- A significant portion of the Project cost has already been experienced. Costs of the Project through FY 83 are $1.618 billion (estimated through September). Obligations are $1.664 billion ($1.507 billion from appropriations, $149 million from utilities, and $8 million from industry contributions).

2. Past Cost and Schedule Reviews

The Project has been subject to a number of significant independent reviews over the past seven years. Among them were the "Passman", "Rizzo", ICE-Parsons and ICE-Gilbert/Commonwealth reviews. Even with the questions raised during the recent Gilbert/Commonwealth review, their conclusion was, "Although Gilbert/Commonwealth's estimate of the total direct craft manhours required to construct the Clinch River Breeder Reactor Plant is 18% higher, the DOE estimate is basically sound."

IV. INDEPENDENT COST ESTIMATES OFFICE (ICE) REVIEW

A. Chronology

Early in 1983 the Independent Cost Estimates Office (ICE) was requested by the Office of the Secretary to review the CRBRP cost and schedule. (A similar review was conducted in March 1982.) A support services contractor, Commonwealth Associates, a subsidiary of Gilbert/Commonwealth (G/C) was assigned the task of reviewing and assessing the DOE Project estimates of material and labor quantities and of developing an independent schedule estimate and providing a comparison between that schedule and the current DOE Project schedule. They were also to analyze the differences with reference to nuclear power construction experience on other projects.

Based on the Draft G/C report and the ICE review, several issues were raised between the Project estimates and those of the ICE team. These were set out by the Director of the Office of Project and Facilities Management memo of April 11, 1982, to the Special Assistant to the Secretary and by the Assistant Secretary for Nuclear Energy in a memo of April 12, 1982, to the Special Assistant. These memorandums are Attachment B and Attachment C.

Subsequently, a reconciliation which enveloped the differences was developed and forwarded by ASNE memo to the Special Assistant to the Secretary on July 5, 1982. The Director of OFP&M concurred in that memo. The memo is included as Attachment D.

In mid August 1983, the ICE Team Contractor's Final Report (Gilbert/Commonwealth) was released to the General Accounting Office in response to a GAO request. The Gilbert/Commonwealth Report did not provide a cost estimate but did raise questions regarding the CRBRP baseline schedule. This is discussed in more detail in Section IV.

B. Residual Issues With the Independent Review and Gilbert/Commonwealth

1. General

The Office of Project and Facilities Management April 11 memorandum, Attachment 2, listed the following areas at issue:

- Installation rates (and total schedule)
- Direct Manhours
- Schedule Detail and Integration
- Bulk Item Quantities
- Scope

2. Issues Primarily Resolved

The latter two issues have been resolved with the exception of being integrated into the detailed project schedule. This is being accomplished in the ongoing effort toward rebaselining.

a. Schedule Detail and Integration

The ICE was concerned that the project did not have a detailed, fully integrated completion schedule. Changes in funding and direction of the Project in the past have created great difficulties in developing completely integrated schedules. The Alternative Financing Plan will provide the kind of stability required to develop and maintain integrated and detailed schedules. The bottoms-up estimate underway will result in a fully integrated and detailed schedule for the Project.

ICE is satisfied with the actions to date and will verify that these have been adequately confirmed in the details as part of their continuing review.

b. Bulk Item Quantities

Reservations were expressed on quantities of: Large and small bore pipes; hangers, snubbers, supports, and restraints for pipes; and large bore pipe welds. The Project Office presented data that resolved the issue of quantities in the design and estimate. Integration into the detailed schedule is ongoing.

c. Scope

The Gilbert/Commonwealth Report indicated that the Project scope may not have properly addressed or provided for: Technical support building, reactor operator training, simulator for operator training, dedicated HVAC for control room, guard training and facilities, spare parts, and testing and startup support. Data was provided that showed these items were provided for in the design and estimate. Integration into the detailed schedule is ongoing.

3. Unresolved Issues

a. Direct Manhours

Gilbert/Commonwealth estimated that 21,751,400 direct craft manhours would be required. Stone & Webster direct manhours were estimated at 18,405,038. Gilbert/Commonwealth questioned the difference of 3,346,400.

In addition to the direct manhours Gilbert/Commonwealth noted that "an in-depth analysis was not carried out for construction management accounts 921 through 950. This account has in excess of 11 million distributable manhours. This is more than twice what other constructors are experiencing."

Stone & Webster has 3,799,904 craft manhours in those distributable accounts. This makes a total of 22,024,942 craft manhours in the job.

ICE has reduced the Gilbert/Commonwealth estimate for added productivity. However, they still carry in question 1,130,000 manhours.

ICE and Gilbert/Commonwealth also claimed that craftsmen for startup and test were not included and will require 400,000 to 500,000 craft manhours. The Project actually provides 492,000 hours for support of preliminary operations from TVA.

b. Schedule

The major residual issue is the construction schedule. The issue is in four parts: LWR experience; construction sequence (logic); schedule duration; and installation rates.

(1) LWR Experience

Gilbert/Commonwealth took actual averages of Light Reactor construction schedule data on 26 plants which were compared directly to the CRBRP planned schedule. They compared the industry experience from Construction Permit (CP) to commercial operations to the CRBRP duration from start of construction, i.e., start of safety-related concrete, to criticality. This comparison is incorrect and misleading.

Since the CP is not synonymous with start of construction nor is commercial operation synonymous with criticality, the data on the 26 plants have been analyzed to put it on the same basis with that of the CRBRP. That analysis is shown on Chart 1. It shows that the average time, without any corrections which should be made, from start of concrete to commercial power is 112 months, not 120 months, as Gilbert/Commonwealth implied. When proper adjustments are made for deliberate planned extensions because of financing problems and lower load growth projections, the average duration is 100 months.

CHART 1
ANALYSIS OF CONSTRUCTION DURATION AND DELAYS

PLANT	(1) GILBERT/ COMMON-WEALTH IDENTIFIERS	ACTUAL CONSTRUCT-ION PERMIT	GROUND BREAKING	START SAFETY RELATED CONCRETE	START COMMERCIAL OPERATIONS	(2) DURATION CONCRETE TO COMMERCIAL OPERATIONS	FINANCIAL DELAYS REPORTED	LOAD GROWTH REDUCTIONS REPORTED DELAYS	(3) DURATION LESS DELAY	(4) GILBERT/ COMMON-WEALTH DURATION	REGULATORY CHANGES DELAYS	CONSTRUCT-ION PROBLEMS DELAYS	ENGINEERING PROBLEMS DELAYS	OTHER DELAYS
NORTH ANNA 2	A	2/71	12/69	2/71	12/80	118	–	–	118	100	–	–	–	–
FERMI 2	B	9/72	5/69	12/70	11/83	155	41	–	114	162	14	11	16	19
WPPS 2	C	3/73	8/72	5/73	2/84	129	–	–	129	139	–	57	–	20
SHOREHAM	D	4/73	11/72	3/73	3/83	120	–	–	120	127	2	59	–	5
ZIMMER	E	10/72	3/71	6/73	4/83	118	–	–	118	117	–	29	–	38
LIMERICK 1	F	6/74	5/70	7/74	4/85	129	19	24	86	144	9	12	–	–
MIDLAND 1	G	12/72	3/73	8/73	7/84	131	24	–	107	127	25	–	–	–
SUSQUEHANNA 1	H	11/73	11/73	9/74	5/83	104	–	12	92	114	–	–	–	26
SAN ONFRE 3	I	10/73	2/74	11/74	8/83	105	–	–	105	123	6	2	–	21
BEAVER VALLEY 2	J	5/74	5/74	11/76	5/86	14	31	7	76	145	–	–	4	16
BELLAFONTE 1	K	12/74	9/74	6/75	11/85	125	–	–	125	137	–	–	–	71
NINE-MILE POINT 2	L	6/74	8/75	5/77	10/86	113	–	–	113	149	18	–	16	12
PERRY 1	M	5/77	10/74	3/76	5/84	98	–	–	98	116	17	–	–	–
WATERFORD 3	N	11/74	11/74	12/75	7/83	91	–	–	91	105	14	21	–	20
MILLSTONE 3	O	8/74	5/74	10/74	5/86	139	48	18	73	142	–	–	–	–
BYRON 1	P	12/75	4/75	12/75	2/84	98	–	4	94	101	–	–	–	31
BRAIDWOOD 1	Q	12/75	8/75	3/76	10/85	115	12	–	103	123	–	–	–	35
SATSOP (WPN 3)	R	4/78	4/77	9/78	12/86	99	–	–	99	131	–	35	–	–
CATAWBA 1	S	8/75	5/74	4/76	6/85	110	20	6	84	104	–	–	–	–
SOUTH TEXAS 1	T	12/75	9/75	4/76	6/87	134	–	–	134	102	–	79	–	–
MCGUIRE 1	U	2/73	4/71	7/72	12/81	113	8	–	105	107	13	–	–	9
HOPE CREEK 1	V	11/74	3/76	8/77	6/86	106	–	19	87	131	18	11	–	12
PALO VERDE 1	W	5/76	5/76	8/76	12/83	88	–	–	88	85	9	–	–	12
RIVER BEND 1	X	3/77	4/79	5/79	12/85	79	18	–	61	97	–	–	–	–
WOLF CREEK	Y	5/77	1/77	6/77	5/84	83	–	–	83	85	–	–	–	14
MARBLE HILL	Z	4/78	8/77	1/78	12/86	107	–	–	107	113	–	–	–	82
					AVERAGE	112 MO			100.0 MO	120.2 MO				

(1) GILBERT COMMONWEALTH IDENTIFIERS REFERS TO THE ALPHABETIC IDENTIFIERS WHICH GILBERT/COMMONWEALTH USED TO DESIGNATE INDIVIDUAL PLANTS IN TABLE 4.3.3 OF THEIR REPORT PREPARED FOR THE HEADQUARTERS INDEPENDENT COST EVALUATION TEAM.

(2) DURATION IS FROM START OF SAFETY RELATED CONCRETE CONSTRUCTION TO START OF COMMERCIAL OPERATION.

(3) DELAY REFERS TO TIME LOST DURING CONSTRUCTION CAUSED ONLY BY FINANCIAL CONSTRAINTS OR REDUCED LOAD GROWTH PROJECTIONS.

(4) GILBERT/COMMONWEALTH DURATION REFERS TO THE DURATION COLUMN IN TABLE 4.3.3 OF THE GILBERT/COMMONWEALTH REPORT TO THE HEADQUARTERS INDEPENDENT COST EVALUATION TEAM.

It is also quite significant to note that several plants, for utilities that need the capacity, are being constructed in time spans comparable to those for CRBRP. Table 5 lists those plants and their experience. It is interesting to note that St. Lucie 2, which had 75 percent of its design completed prior to construction (CRBR has more than 92 percent complete), was built in 11 months less than the CRBR schedule.

(2) Construction Sequence (Logic)

Gilbert/Commonwealth based their sequence for starting individual buildings upon general experience for recent nuclear plants and their judgment based on acheivable manpower peaks. Their logic on sequencing is wrong for the CRBRP and adds time to the schedule that is not required.

The Gilbert/Commonwealth summary chart, Chart 2, shows reactor containment starting 18 to 24 months later than the Stone & Webster logic. The reactor building is on the critical path and that sequencing used by Gilbert/ Commonwealth adds directly to the construction period unnecessarily.

LWR practice often requires substantial progress on the reactor building before starting the other structures. This is not the case for the CRBRP. The CRBRP design and construction permits work to start on five major structures within nine months of each other and four of those five essentially simultaneously. Gilbert/Commonwealth spreads those same starts out over a year and delays the diesel generator start 27 months. This forces additional structures on the critical path, adds to the construction time, introduces the possibility of additional delays, and seriously retards or eliminates the ability to work around or resolve problems. The construction logic may fit LWR's but it is improper for the CRBRP and penalizes the schedule for completion severely.

The CRBRP has been designed to be constructable. Its area and volume of space to work in are significantly larger than LWR's. This is illustrated on Charts 3 and 4. The area is large enough to permit working on several structures at once. Additionally, the common Nuclear Island Base Mat permits starting work on several structures at one time. This not only improves productivity but also permits using larger crews should it be required.

TABLE 5

SELECTED RECENT LWR CONSTRUCTION PERIODS

PLANT	CONSTRUCTION PERMIT DATE	START OF CONCRETE	COMMERCIAL OPERATIONS	CONCRETE TO COMMERCIAL OPERATIONS DURATION/MOS.
WOLF CREEK	5/77	6/77	5/84	83
RIVER BEND 1	3/77	5/79	12/85	79
WATERFORD 3	11/74	12/75	7/83	91
PAL VERDE 1	5/76	8/76	12/83	88
ST. LUCIE 2	5/77	7/77	5/83	70
			AVERAGE	82

Comparable CRBRP Schedule is 81 Months.

SYS2 QS1:[362,1]CLINCHRV.DGN;1

EXHIBIT NO.
4.2.1

CHART 2

CLINCH RIVER BREEDER REACTOR PROJECT
PROJECT SCHEDULE EVALUATION
SUMMARY BY BUILDINGS

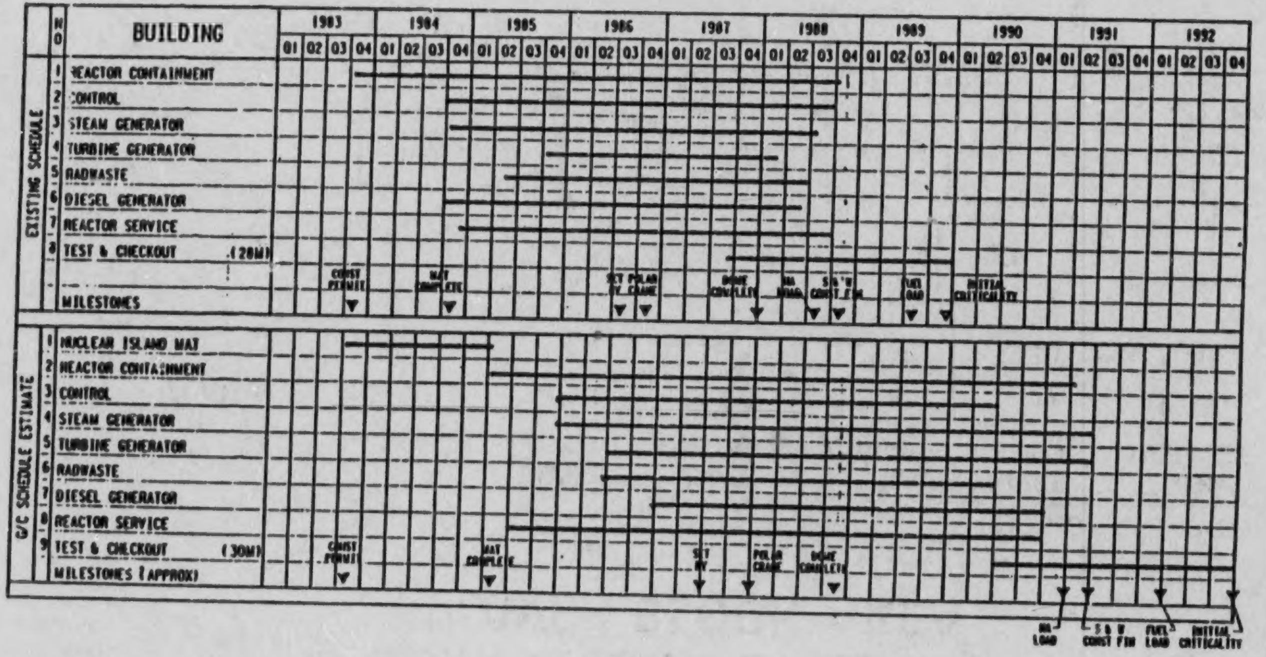
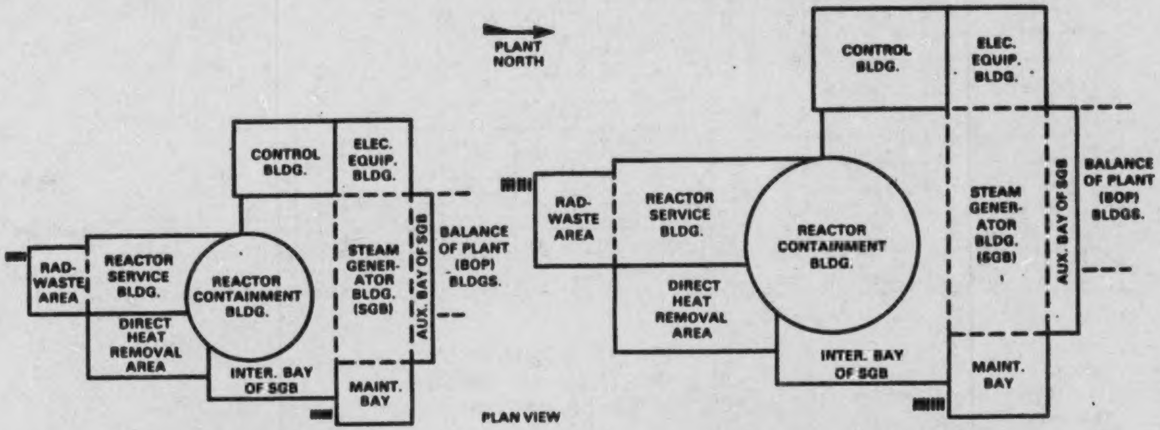


CHART 3
COMPARISON OF SIZE OF POWER BLOCK AREA

	RIVER BEND	LWR AVERAGE	CRBRP	RATIOS OF CRBRP TO RIVER BEND	RATIOS OF CRBRP TO LWR AVERAGE
• PLAN AREA (10^3S.F.)	122.0	141.0	188.0	1.54	1.33
• VOLUME (10^6C.F.)	12.4	16.1	28.4	2.29	1.76


PLANT NORTH
CONTROL BLDG.
ELEC. EQUIP. BLDG.
RAD-WASTE AREA
REACTOR SERVICE BLDG.
REACTOR CONTAINMENT BLDG.
DIRECT HEAT REMOVAL AREA
STEAM GENERATOR BLDG. (SGB)
AUX. BAY OF SGB
BALANCE OF PLANT (BOP) BLDGS.
INTER. BAY OF SGB
MAINT. BAY
PLAN VIEW

REPRESENTS 140' DIAMETER CONTAINMENT

REPRESENTS 200' DIAMETER CONTAINMENT CRBRP LAYOUT

CHART 4
SCHEDULE OVERVIEW AND SUMMARY
CLINCH RIVER AND RECENT LIGHT WATER REACTOR EXPERIENCE COMPARISON OF MAJOR DESIGN FEATURES AND IMPACTS ON SCHEDULE FLEXIBILITY

								RATIOS OF CRBRP TO	
ITEM DESCRIPTION	RIVER BEND 1	GRAND GULF 1	SUSQUE-HANNA 1	PALO VERDE 1	VOGTLE 2	AVERAGE	CRBRP	RIVER BEND	AVERAGE
• POWER BLOCK									
– PLAN AREA (10^3 S.F.)	122.0	137.0	109.0	144.0	194.0	141.0	188.0	1.54	1.33
– VOLUME (10^6 C.F.)	12.4	16.2	14.2	15.4	22.1	16.1	28.4	2.29	1.76
• CONSTRUCTION % COMPLETE	75.0	100	100	100	55.0	–	3.0	–	–

- LARGE LWR (1100-1300 MW) REACTOR CONTAINMENT BUILDING DIAMETER = 140′ AVERAGE

  CRBRP (350 MW) REACTOR CONTAINMENT BUILDING DIAMETER = 200′

  DIAMETER DIFFERENCE = 60′

- LARGE LWR (1100-1300 MW) REACTOR CONTAINMENT BUILDING PLAN AREA = 15,400 SQ. FT.

  CRBRP (350 MW) REACTOR CONTAINMENT BUILDING PLAN AREA = 31,400 SQ. FT.

  PLAN AREA DIFFERENCE = 16,000 SQ. FT.

  PER CENT DIFFERENCE PLAN AREA = 104%

- LARGE LWR (1100-1300 MW) AVERAGE MANUAL MANPOWER PEAK = APPROX. 4,000 MEN (1ST SHIFT 3,000 PLUS 2ND SHIFT 1,000)

  CRBRP (350 MW) PLANNED MANUAL MANPOWER PEAK = APPROX. 2,300 MEN (2,000 S&W PLUS 300 SUBCONTRACTOR PER SHIFT)

- CONCLUSIONS
  - CRBRP HAS PLANNED FEWER CRAFTSMEN IN APPROXIMATELY ONE THIRD MORE SPACE OF A LARGE LWR.
  - MANPOWER LEVELS CAN BE INCREASED AS CORRECTIVE ACTION FOR LACK OF PROGRESS WITHOUT CREATING CONGESTION AND SATURATION PROBLEMS.
  - SCHEDULE FLEXIBILITY AND PROGRESS RECOVERY ABILITY IS FAR MORE FAVORABLE THAN RECENT LWR EXPERIENCE.

(3) Schedule Duration

Gilbert/Commonwealth developed its opinion of CRBRP schedule duration by utilizing Stone and Webster Engineering Corporation (SWEC) quantities to estimate construction manpower requirements, and from them, activity durations. Their schedule estimate was based on utilizing two shifts. They did not use rolling 4x10's. The ICE team subsequently reduced the Gilbert/ Commonwealth schedule to account for the rolling 4x10's.

(4) Installation Rates

(a) General

The single largest area of disagreement is on installation rates. This issue falls in two areas: CRBRP rates compared to historical averages, and secondly, CRBRP rates considering Stone & Webster experience at the River Bend Nuclear Plant. The ICE Team does not believe the Project can attain and sustain the rates used in developing the Project schedule.

(b) Historical Rates

Much of the ICE concern is based on LWR installation rate data developed six years ago in 1977 for use in a past CRBRP schedule review (Passman review). They are also concerned about the duration updated on a March 83 version. This data has become somewhat of a standard for comparison and at least the initial source of concern by ICE at this time when considering the CRBRP rates. That data has been revised by Bechtel, who developed the initial chart in 1977. The old and new data is shown on Table 6.

Moreover, whatever the historical LWR data set used for comparison, it is incorrect to include in that data set plants for which installation rates have been constrained by lack of funding or plants which do not enjoy major productivity improvements, e.g., rolling 4x10's. The CRBR estimate assumes success of the AFP and therefore a stable funding profile, and CRBR will employ the rolling 4x10 shift arrangement.

(c) Recent Experience

The recent installation experience is generally much higher than the previously listed average LWR data developed in 1977 for plants in the early/mid 1970's.

The CRBRP data are for nuclear island only and exclude yard, service, and maintenance buildings. The recent LWR history is on the same basis.

(d) Constructor's Management Commitment

Stone & Webster Engineering Corporation, the CRBRP constructor, remains confident that the CRBRP schedule is realistic and achievable if the necessary funds are available and has so assured the Secretary in writing.

(e) Bechtel Review

Bechtel was requested to review the installation rates. They conclude that the schedule is tight. While the schedule is aggressive, there is a large degree of correlation between the CRBRP sustained installation rates and Bechtel experience which demonstrates that the schedule is achievable. They have identified several actions which can further enhance the probability of achieving the schedule:

- Start rolling 4x10's on concrete early
- Start bulk installation work on early start date
- Those installation rates which exceed recent history should be reduced or a plan developed to assure achievement such as increased manning and/or providing a second production shift.
- Give special emphasis to work packaging, optimal use of all shifts, management's timely involvement in potential critical path schedule variances, and tighten up the civil schedule to extend the mechanical/electrical phases.

In light of the above and if the institutional aspects are not restrictive, Bechtel feels that the schedule is highly achievable.

(5) Contingency Rates

The latest Project assessment provides about $216 million in contingency or about 10 percent. The ICE Team suggests a contingency of $270 million. The lower Project contingency is based on the advanced status of the Project as noted previously.

TABLE 6

QUANTITY INSTALLATION RATE COMPARISON
(SUSTAINED AVERAGE RATE FROM 10% TO 90% COMPLETE)
(ALL RATES APPLY TO POWER BLOCK)

	AVERAGE RATES		MAXIMUM RATES		RIVER BEND		CRBRP
COMMODITIES	PRE-1977 LWR HISTORY	RECENT EXPERIENCE	PRE-1977 LWR HISTORY	RECENT EXPERIENCE	ACTUAL (MANNING LIMITED BY FUNDS)	PROJECTED (MANNING NOT FUNDS LIMITED	
CONCRETE CY/MO	2,800	5,360	6,000	9,200	5,773	7,500	6,700
LARGE PIPE LF/MO	3,000	4,680	4,300	5,700	5,794	7,550	4,100
SMALL PIPE LF/MO	3,900	4,460	6,100	6,200	6,222	8,100	5,500
CABLE TRAY LF/MO	1,400	3,490	2,200	6,500	3,856	5,000	4,800
METAL CONDUIT LF/MO	6,100	10,680	14,200	13,000	13,021	16,900	13,200
WIRE & CABLE LF/MO	106,000	207,700	246,000	230,300	230,300	299,000	274,000
TERMINATION LF/MO	3,900	5,630	7,400	7,100	2,542*	N/A	16,500

* Completion at only 11%, not valid for comparison, planned at 16,880 per month.

The Project Office has compared the contingency to the Gas Centrifuge Enrichment Plant (GCEP) Project factors and found the GCEP percentage contingency level to be virtually the same as that calculated by the CRBRP Project Office.

Funds will be allocated to the Project contractors at an escalation rate of 6 percent as compared to the Project use of 6.5 percent. This will provide an additional $34 million management reserve which will be managed by the Project Director.

Another issue has been raised by the ICE Team relative to contingencies. The constructor had identified $90 million in its cost estimate for "design evolution." This $90 million is described by the Project as construction contingency and is part of the $216 million given above. The contractor has said that design evolution "is to cover additional scope that will be identified as the design is completed." That is what contingency is for. With the status of design at 92 percent complete, "design evolution" should be small and should be covered along with other factors that make up contingency. Leaving it in the constructor's distributable budget and adding a second contingency below would be double budgeting. It also gives the constructor a lump of funding for undesignated uses. The ICE Team indicated that the $90 million represented a difference with the AE over material take-off quantities. The Project has investigated this allegation and found that there is no significant disagreement between the two contractors over take-off quantities.

The contractor has agreed to remove the design evolution from its distributable account. The Project contingency will remain below the line. ICE has nevertheless indicated that it is concerned that there are unknown quantities which should be covered in the construction estimate in addition to being part of the Project Contingency.

V. DEPARTMENTAL SCHEDULE MARGIN FOR COMMERCIAL POWER AVAILABILITY

A. Margin Period

ASNE has concluded that the current assessment of cost and schedule as shown in Table 4 is reasonable and appropriate while ICE for the reasons noted above believes that a stretch in schedule to commercial operations should be considered when assessing the viability of the Alternative Financing Plan. ICE and the ASNE agreed that the Project should be planned, executed, and administered to the schedule proposed by the Project Office in order to provide Project Office and contractor discipline (see Attachment C). However, this would result in a scheduled date for commercial power of August 1990. In order to provide flexibility in the date for attaining power operation and selling power, a 15-month margin period was suggested that would result in a late date for power of November 1991. This flexibility may be useful in negotiations of an agreement with the private corporation being established in connection with the Alternative Financing Plan. This schedule is depicted on Chart 5.

B. Potential Cost Associated with Departmental Margin

The potential cost associated with the 15-month margin has been calculated at $123 million (based on 6.5 percent escalation). In order to calculate the potential cost, 12 months were added to the construction period and 3 months to the test and start up period. Added costs were associated with: a longer construction interval; extended management, technical, and administrative staffing for the longer period; added time for operational personnel duration and for an extended time period during startup; and added cost for escalation of a portion of the work to a later period.

C. Summary of Estimated Costs-to-go and Funds Required Including the Margin Period

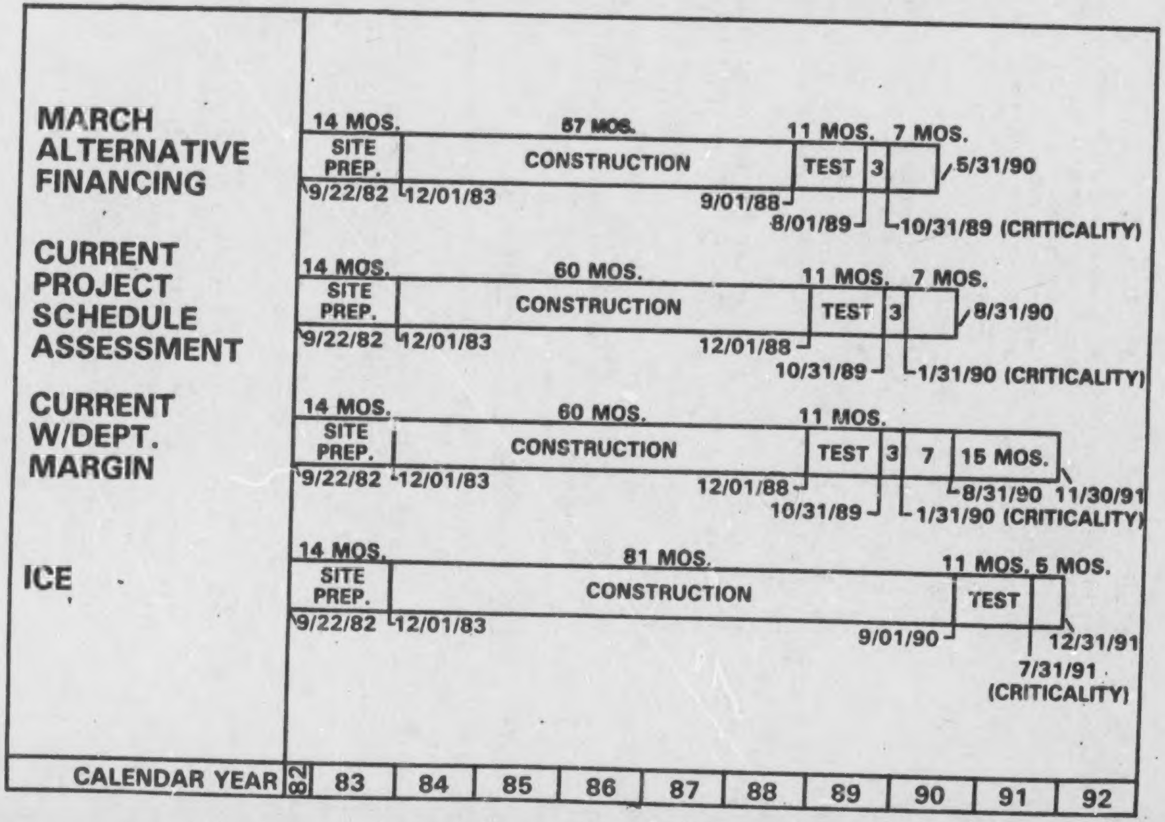
1. Estimated Costs-To-Go (FY 84 through August 31, 1990, the end of the scheduled power-up period, plus the cost of the 15-month margin period from August 31, 1990, to the late power availability date November 30, 1991)=$2,426 million plus $123 million = $2,549 million.

2. Funds Required ($2,549 million minus $45 million available at the start of FY 84) = $2,504 million.

D. Funds Available to the Project Assumed in the Alternative Financing Plan

$2,500 million

CHART 5
CRBRP SCHEDULE COMPARISONS



E. Administration of the Departmental Margin

The ASNE recommends that funding associated with the Departmental Margin ($123M) be held at the Department level. The ASNE CRBRP Project Office position is that the Project can and will be finished on time and within the estimate. The intent of the margin is to provide flexibility and increased confidence during negotiations to emplace the AFP.

F. Impact on Financial Package

The alternative financing plan transmitted to the Congress by the Secretary on August 1, 1983, contained an illustration of how $1 billion of privately financed construction funds can be raised. Table 7 sets out the funding requirements for the current case and for the current case plus margin. Table 8 illustrates the impact that the longer construction periods and higher costs would have on the plan.

The comparison in Table 8 indicates that in the current assessment of Project cost, there will be no significant change in the cost of debt service under the Alternative Financing Plan. The existing plan had assumed debt service cost of $110 million per year and the $108 million annual payment for the current assessment reflects slightly lower borrowings in the early construction years assuming lower production which reduces interest cost. The impact of an additional 15-month period to start of commercial operations reflected in the Departmental margin would raise debt service by $24 million per year due to increased interest during construction.

VI. SPECIFIC RESPONSES TO THE SECRETARY'S INQUIRIES

Your memorandum to me dated August 19, 1983, requested specific responses to the following points:

A. "A statement of all current information, if any, relevant to the present estimates which might cause a reasonable manager to conclude that the cost of completing the CRBRP might exceed the most recent figure of $2.5 billion (including the $100 million contingency)."

Based on our review of the cost estimate and the points raised by the ICE, I believe the current cost and schedule estimates are most reasonable and can be achieved. The sensitivity analyses we have performed, the ICE review, the expert judgment of our own contractors and an independent review by Bechtel of placement rates all indicate that it is very unlikely that the actual cost will exceed the $2.5 billion estimate. There is, however, one major caveat. The annual funding levels set forth in the Alternative Financing Plan must be assured. Funding shortfalls can have a devastating impact on schedule and thus costs. Cost increases from most other causes can be offset by countervailing savings and use of contingency.

TABLE 7

CRBRP FUNDING ESTIMATES

in millions of year-of-expenditure dollars
@ 6.5% annual escalation rate

Fiscal Year:	84	85	86	87	88	89	90	91	92	Tota
1/31/90 Initial Criticality and 8/31/90 start of Commercial Operations										
Total Costs	420.8	607.3	626.7	368.7	236.2	107.0	60.0			2,426.
Total Funds	481.8	640.7	566.5	338.1	204.1	95.8	54.1			2,381.
Util. Contrib.	20.7	23.8	23.8	22.8	21.0	21.0	39.0			172.
Other Contrib.	1.4	.2	.2	.2			2.0			4.
Net Funds Req'd.	459.7	616.7	542.5	315.1	183.1	74.8	13.1			2,205.
1/31/90 Initial Criticality and 11/30/91 start of Commercial Operations										
Total Costs	403.8	594.5	610.4	385.5	270.5	178.9	75.1	27.8	3.0	2,549.
Total Funds	464.8	627.9	550.2	354.9	238.4	167.7	69.2	30.8	-0-	2,503.
Util. Contrib.	20.7	23.8	23.8	22.8	21.0	21.0	4.0	3.0	34.0	174.
Other Contrib.	1.4	.2	.2	.2					2.0	4.
Net Funds Req'd.	442.7	603.9	526.2	331.9	217.4	146.7	65.2	27.8	(36.0)	2,325.

September 2, 1983

TABLE 8

EFFECT OF COST ASSESSMENT
ON ALTERNATIVE FINANCING

	BRC Task Force 6/29/83 Report	Current Assessment	Current Assessment plus Deparmental Margin
	Millions		
Proceeds of 30-yr Bonds	$ 1,040	$ 1,020	$ 1,260
Deduct Interest during Constr.	365	346	588
Direct CN funds from borrowings	675	674	672
New Equity Participants	150	150	150
Funds Already Committed by Utilities and Others, Including Interest	175	176	178
	$ 1,000	$ 1,000	$ 1,000
Annual Debt Service on 30-yr Bonds	110	108	134

To answer the question quite literally, I currently possess no information which would indicate that the $2.5 billion estimate is insufficent to complete the project. This estimate, as with any estimate is based on facts, judgment and assumptions. The factors which I believe are most likely to increase (or decrease) the current cost estimate of $2.381 billion are discussed below.

1. Construction Schedule

Based on the Gilbert/Commonwealth study, the ICE Team concluded that the CRBRP construction schedule was too short. This conclusion resulted from three areas of concern:

a. Overall LWR reactor average historical construction span times which G/C said were far longer than planned for CRBRP.

b. Construction placement rates based on historical data on LWR experience which was lower than assumed for CRBRP.

c. Additional Direct Craft Manhours.

The Gilbert/Commonwealth-ICE Team schedule was based on their assessment of quantities and manhours and later compared to average historical LWR installation rates and construction experience based on a 26 plant composite which did not take into account the unique factors associated with the CRBRP. G/C-ICE did not take into account the fact that CRBRP design is 92 percent complete, that procurement is 71 percent complete, and that the Project is now nearly ready to begin placing Nuclear Island concrete. CRBRP has one-third more area on the Nuclear Island Mat and one-half the worker density of a large (1100-1300 Mw) LWR. CRBRP has the flexibility to increase worker density on the same shift or even add a second shift, or both, if necessary to meet its projected construction schedule. An important case in point is St. Lucie 2, which like CRBRP, started construction at an advanced state of design (75 percent versus 93 percent for CRBRP) was constructed and placed in commercial operation in only 70 months, 12 months shorter than planned for CRBRP. It could be argued that not only should CRBRP meet its schedule it can probably better it. Indeed, the Bechtel Corporation has reviewed the CRBRP construction schedule and feels it to be "highly achievable".

Section IV.B.3.b contains a more detailed discussion of schedule planning and commodity installation rates are discussed in Section VI.B.4.

2. Escalation

The current cost assessment is based on an escalation rate of 6.5 percent per year as recommended by the ICE Office. Of course escalation may be different than projected; for example, the most recent OMB guidance for major physical investments is 5.0 percent per year through 1988. Change in escalation will impact the project cost at the rate of about $70 million per percent increase or decrease.

3. Recent Bid Experience

There have been 70 contract awards during 1982 and 1983 by the architect-engineer, reactor manufacturer, and constructor. Those awards were 33 percent ($91 million) less than the design estimates. There were 19 over the estimate and 50 lower than the estimate with one at the estimate level.

Conservatively excluding the steam generators and site preparation which were the large items (both significantly under estimate), the awards were still 18 percent ($28.7 million) less than estimated.

No. of Actions	Estimate	Award	Delta	Percent Underestimate
70	$279,594	$188,397	$91,197	33
68*	$158,583	$129,897	$28,686	18

*Without steam generators and site work.

Extrapolating the more conservative trends would result in nearly $100 million reduction on work yet to be awarded. That kind of reduction in the estimate is not proposed. However, the current trend is clear and supports our conclusion that procurement estimates tend to be conservative.

B. "A clear statement of all assumptions made in preparing the present estimates which arguably might be material to such estimates and a further statement describing in a meaningful manner the likelihood that the various material assumptions made will be valid during the entire construction period."

The following assumptions have an impact on the cost estimate and our assessment of its reliability. They are listed below and then discussed in more detail.

- Federal and private funds from Alternative Financing Plan available by April 1, 1984, and in particular one-half of the requested FY 1984 appropriation ($135 million) will be available on October 1, 1983.
- NRC Construction Permit in November or early December 1983.
- Escalation Rate 6.5 percent.
- Project estimated commodity installation rates will be attained.
- No major licensing changes.
- Labor accord, productivity, and availability.
- Construction material quantities and labor within contingency.
- No significant intervention or disruption of construction.
- Revenue during startup.
- Fuel costs as projected.
- Equipment suitability.
- Orderly Startup.

1. Funds Availability

The Alternative Financing Plan is endorsed by the utilities, labor, the nuclear industry, investment bankers, the scientific community and the Administration. The Administration forwarded the plan to the Congress on August 1, 1983, urging that enabling legislation be passed. Possible outcomes are discussed below.

a. Positive Action on The Full Appropriation

If the vote on the Alternative Financing Plan is positive and funds are appropriated, the Project can go forward as scheduled. The investment banking firms advise that if we assume positive action by Congress, private financing cash flow could begin by April 1, 1984.

b. Negative Action and Vote to Terminate

If the Congress votes to terminate, the Project would proceed to do so in a way that would be most useful in the future. Work would be terminated in a deliberate manner, equipment disposed of and the site placed in an environmentally suitable condition considering the legal guidelines as well as the wishes of the owner, TVA, and the Department.

c. Continuing Resolution for the Project at the FY 83 Level

Should Congress vote a continuing resolution for the Project at last year's funding level, and with similar restraints to last year, the Project completion would slip on a day-for-day basis since work could not proceed on the critical path. In the case of a continuing resolution that would allow working on the critical path, the Project would proceed. In either case, however, it is questionable if the Breeder Reactor Corporation would issue a call for contributions until the matter was resolved, and it is also questionable as to the rate and progress that would be made on private financing. It is probable that the Project would slip on a day-for-day basis in this case as well.

d. No Action

If action is not taken to provide added funding to the Project on or before October 1, 1983, the Project would effectively be in termination. The contractors would have to be notified on October 1, 1983, that funds were not available and this would place the Project in constructive termination. While there will be $45 million in uncosted obligations at the end of FY 1983, most of these are for subcontracts and represent hard commitments. These subcontracts would have to be terminated. There are no funds appropriated to cover termination costs and such funds would need to be immediately requested unless provided by the Congress.

2. Construction Permit (CP)

Public hearings were completed on August 11, 1983. There were no matters of dispute between the NRC and DOE. The intervenors had withdrawn from the CP process prior to the hearings. It is expected that the Atomic Safety and Licensing Board will issue its decision by early October. NRC regulations provide that its Appeals Board shall determine within 60 days if the decision should become effective. Since the CP is now uncontested, the Appeals Board could render its decision in less than 60 days. The regulations also provide for the Commission to reach a decision within 20 days of receipt of the Appeals Board decision. Again, since it is uncontested the Commission should be able to render its decision in less than 20 days. If the Appeals Board and Commission follow the same schedule for review of the CP which they achieved in the Spring of 1983 for the Limited Work Authorization (which was contested by intervenors), then the CP would be issued by about December 2, 1983. If their review schedule was consistent with the time increments given in the regulations, then the CP would be issued in late December. It is highly probable that the CP will be available to support the Project on a timely basis.

3. Escalation

The Project has historically used an 8 percent escalation rate. Improvements in the economy in the last 2 years have resulted in reduced estimated out-year escalation rates by both government and private sector analysts. The Department has recently adopted a 7 percent operating expense rate for projects associated with the weapons program. OMB guidance for operating expenses on federal construction projects averages about 5 percent over the projected life of the CRBRP Project. The constructor is estimating a rate of 5.2 to 5.4 percent. The escalation rate being used in the development of the new CRBRP baseline estimate is 6.5 percent (based on ICE Office guidance). The Project proposes to budget allocations to Project participants based on a 6 percent rate with the other five-tenths percent retained in the Project contingency.

One and one-half percent of escalation (from 8 to 6.5 percent) is worth about $105 million over the projected Project execution period (now until 1990). There could be a further reduction in the estimated cost of about $105 million if the OMB projections (from 6.5 to 5 percent) are realized or a potential increase of about $35 million if the DOE rates prozected for weapons projects (from 6.5 to 7 percent) occur.

4. Commodity Installation Rates

The rates have been discussed in Section IV.B.4 and a sensitivity analysis presented in Section VI.C. Additionally, there is flexibility for increasing the installation rates if they lag. This can be done by further increasing the people on shift or by an added production shift during high intensity periods. The configuration of the CRBRP, the planned construction sequence, and the use of rolling 4x10's will permit a judicious application of either approach if required.

5. Licensing Changes

CRBRP is at an advanced stage of licensing. There are no outstanding safety issues. The ACRS has reviewed the safety aspects, the ASLB has finished hearings and a Construction Permit is anticipated late this Fall. Only confirmatory actions are required to satisfy the Safety Evaluation Report.

The Project has a computerized data base for tracking of licensing commitments with NRC and associated cost impacts. A large majority of these items have insignificant cost impact or have already been included in the total plant cost estimate.

The remaining unresolved issues are listed by item in Table 9. Where a probability exists that an impact will be realized, the cost has already been included in the total estimated cost of the Project. The potential range of impact on the remaining items is approximately $0.5 million to $11.5 million.

It is mutually felt by the CRBRP and the NRC that these items will be resolved with minimal impact to Project cost.

6. Labor Accord, Productivity, and Availability

   a. The Building Trades Department of the ALF/CIO has signed, along with the constructor, the Nuclear Power Construction Stabilization Agreement. This Agreement has proven to be a success at SWEC's River Bend job. The Agreement provides for no strikes, shut downs, or lockouts. It is a national level labor agreement. The President of the Building Trades Department is an active backer and advocate of the Project and the Project receives his personal attention. Good relations have existed on construction at the site to date and are expected throughtout the job.

   b. The CRBRP will be constructed using the rolling 4x10's approach. Savings in total cost offset the added costs of administering the rolling 4x10's. This provides for two crews working alternating four-day periods at 10 hours per day. It provides 70 work hours a week essentially around the calendar. Based on experience on other jobs several reasons have been determined for increased productivity:

      - 70 work hours per week are applied to the project, rather than 40.
      - There is less crowding and more work space.
      - Less crowding also results in a safer work environment.
      - Absenteeism is lower.
      - Morale is higher since the work week is shorter and the off-time longer.
      - Fatigue is not as apparent on 4 ten hour shifts as on 5 tens or other extended schedules.
      - Fewer crew changes are required than double shifting.

      The American Management Association and Bureau of National Affairs studies confirm the conclusions on four-day work weeks.

      In addition to productivity increases related to the rolling 4x10's the workers in the area serving the CRBRP site are historically known for high productivity.

TABLE 9

POTENTIAL IMPACT OF LICENSING CHANGES

ITEM	THOUSANDS IMPACT
Fuel Development	\$ 0-500
Materials Confirmation Data	\$ 0-4000*
In-Service Inspection	\$ 500-5800*
SHRS Electrical Supply	\$ 0-1000*
Generic Safety Issues	\$ 0-200*
Total*	\$ 500-11,500

*Most likely value of these impacts is at the bottom of the range.

c. Unemployment in the area serving the site is above the national average. The recent reduction by TVA in nuclear powerplant construction has made thousands of skilled craftsmen available. Additionally, the rolling 4x10's which result in working four days then being off four days makes travelling to the work area more convenient and broadens the area from which the workers will come.

7. Construction Material Quantities, Construction Labor and Construction Distributables

The AE has the primary responsibility for construction direct costs until the construction package is certified for construction and turned over to the constructor. There has been continuous dialogue between the constructor, the architect-engineer, and the Nuclear Steam Supply System designers for more than 7 years. The estimates are updated from semi-annual cost reviews and from Engineering Change Proposals (ECP's) through the Configuration Control Procedures. There is a continuing series of checks and balances on the construction estimates between the constructor and the architect-engineer. Additionally the constructor analyzes its experience at other nuclear plants to check for comparability, omissions, or duplications.

Traditional procedures are used for developing quantities of materials, construction labor, and distributables. The methodology and estimates have been subjected to many in-depth reviews including several independent cost estimate reviews, such as the "Passman," "Rizzo," "Parsons," and "Gilbert/Commonwealth" reviews.

It is unusual to have the design and procurement so far along prior to start of safety-related construction. Many of the reasons previously stated as giving confidence in the estimate apply directly to quantities. For these reasons the quantities, man-hours and indirect costs are believed accurate within the range of the contingency provided for the construction. The estimate could be lower based on actual bid experience and productivity encountered to date.

It should be noted that the ongoing Project "bottoms-up" cost and schedule baseline efforts are incorporating the rolling 4x10's approach for the first time from a bottoms-up point of view.

Overall, the risk of upward deviations in cost should be well within the contingency provided in the estimate.

8. Intervention and Disruption

Intervenors withdrew from the licensing process for the Construction Permit and accordingly have surrendered their legal recourse through that avenue. They have not withdrawn from the process for an Operating License, and it is likely they will be active when that process is started in the future. Based on the soundness of the CRBRP from a safety point of view and the commitment to a well documented, high quality construction program, intervention during the operating licensing proceedings should not delay the Project to any significant extent.

The Project has identified and pursued other permits and licenses diligently and is taking extraordinary steps to meet or exceed the requirements. There is still a potential for intervention. However, any impacts will be mitigated by the Project's being procedurally correct and attentive to execution.

The CRBRP is accepted and wanted in Oak Ridge and the surrounding area. There have been no demonstrations or disruptions to date at the site. The population in the Oak Ridge area is generally sophisticated and knowledgeable about nuclear energy. Many make their living working on nuclear programs. Special efforts have been and are being made to cultivate neighbors of the Project. The access to the site is quite easily controlled. The site is within the Department of Energy, Oak Ridge Operations Office reservation. No interference or intervention of any significance has occurred or is expected.

9. Revenue During Startup

The cost estimate has always been based on the net costs through the five year demonstration period, which included the net revenues during operation. Under the Alternative Financing Plan, revenues after start of commercial operation will be applied to the cost of operation and debt service, and the residual will be divided between DOE and the equity investors in some fashion yet to be determined.

During the period after initial criticality and prior to commercial operations, power will be generated and sold to TVA while the plant equipment is checked out and shaken down. The existing four-party contractor with TVA, PMC, Commonwealth Edison and DOE requires TVA to take the power and pay for it at the highest incremental cost that it would have otherwise incurred to obtain the same amount of power (i.e., TVA's avoided energy cost).

10. Fuel Costs

The cost estimate includes fuel for the initial demonstration core loadings. The estimate assumes that it will be fabricated at the Secure Automated Fabrication (SAF) line at the Hanford Engineering Development Laboratory (HEDL). Significant SAF line delays could impact CRBRP's schedule, however, construction is well underway and on schedule. All critical process equipment has been prototyped and tested successfully on a scaled process mockup. HEDL's actual cost experience in procuring material has been very favorable with procurement of cladding and duct material accomplished significantly under estimate.

11. Equipment

The prototype test program is nearly complete. The only major items where testing is not complete are the fuel and blanket assemblies under test at FFTF and the prototype steam generator under test at the Energy Technology Engineering Center.

To date the equipment tested has met, or in most cases, exceeded requirements. The steam generators continually receive a great deal of attention and their status is set out below.

a. Production Units Contract for Steam Generators

A firm fixed-price contract was let with Westinghouse Nuclear Components Division on July 2, 1982, to fabricate six evaporators, three superheaters and one spare (configured as a superheater) that can be used either way. The superheaters have the highest flows and are being tested via a full-scale model to insure there are no problems with flow induced vibration (FIV). Fabrication of the evaporators is underway because previous analysis and tests indicate no flow-induced vibration problems exist at the lower flow conditions at which the evaporators operate. There have been four changes to the contract. The Government estimate for all these changes is $1.3 million and the contractor estimate is $2.2 million. There are two manufacturing changes being evaluated that could reduce costs by over $100 thousand. The current assessment has been increased by $2.5 million to provide for the known changes and a $500 thousand contingency. Changes to the fabrication have been few and no major changes are anticipated.

b. Steam Generator Testing

The prototype steam generator has been sodium tested to 70 Mw, the capacity of the test facility at Santa Susanna, California, and performance exceeded requirements in all these tests.

The superheater, which has higher flows than the evaporators, has been extensively evaluated by experts in the field for flow-induced vibration. The design has also been tested on a .42 scale model, and more importantly tested at full size.

A back-up design fix which has been verified both analytically and by scale model tests is in place to reduce the flow should it be required. The revision would not affect the fabrication schedule since the six evaporators are being fabricated first and would not be impacted by the $200 thousand change. The change, if required to the superheaters, is neither extensive nor expensive and no schedule impact will occur if the change should be implemented.

12. Orderly Startup

An orderly startup is assumed. A comprehensive startup test plan is in preparation for the CRBRP. It includes all test requirements, test specifications and most importantly, is integrated with the construction schedule to assure timely takeover of equipment and testable groups. The test requirements and testable groups are highly computerized and the Project is studying in detail methods to add flexibility to shift testable groups should the construction sequence change as it inevitably does.

The Project has taken advantage of the lessons learned during the startup of FFTF such as doubling the capacity to unload bulk sodium and get it in to the plant pipelines in half of the time, increasing both the size and number of cold traps to facilitate more rapid sodium purification, and a myriad of other FFTF-learned items have been factored into the design and/or startup test planning of the CRBRP.

In addition, the Project will be supported during startup by the utilities, namely TVA, Commonwealth Edison and other support as required from our 753 utility partners.

13. Conclusion

In conclusion, we feel that the assumptions underlying the current cost estimate are prudent. Although the likelihood they will remain valid during the entire construction period cannot be guaranteed we continue to believe that they are all conservatively based.

C. "An explanation of the nature and extent of the likely adverse impacts upon projected costs resulting from described types of failure of assumptions. For example, if only 80 percent or 90 percent of the projected daily pour rates for concrete were to be realized, the respective, expected cost impacts from such failures of assumption should be stated."

Although I have discussed our assessment that our major assumptions are conservative and prudent, it is important to examine the impact of postulated shortfalls. The sensitivity assessments described below all indicate that the 15 month margin is more than adequate to absorb impacts.

1. Sensitivity Assessments

a. Funds Availability

It is assumed that appropriated funds will be available on October 1, 1983, and private funds available by April 1, 1984. That is based on Congressional action by-the end of September 1983. If Congress does not act then, but puts the Project under continuing resolution, it is assumed that the continuing resolution would be until January 1, 1984. As stated in Section IV, such an action will put the Project effectively in a day-for-day slip. Based on a continuing resolution for the duration of calendar year 1983, the slip would be 3 months and cost about $45 million.

b. Construction Permit

As stated in Section IV, there is considerable reason to believe that the Construction Permit will be available to support start of safety-related concrete by mid-December 1983. An outside date for the CP would be early January 1984. Such a slip would be at most one-half month and the cost under $10M. This cost and delay would not be additive to that for funds availability.

c. Escalation Rate

The current estimate is based on the 6.5 percent escalation guidance from the Department. OMB data for operating expense projects averages about 5 percent. The Department is using 7 percent on Defense projects. Because of the positive results of the Administration's efforts to date to reduce inflation, there is a possibility that the lower rates will be sustained. One percent of escalation is worth about $70 million over the Project execution period (from now until 1990). Accordingly, the cost could swing from a reduction of $105 million based on 5 percent to an increase of $35 million at 7 percent. There is no direct schedule impact.

d. Commodity Installation Rates

A sensitivity analysis has been run by reducing the proposed CRBRP commodity installation rates by 10 percent and 20 percent. All of the commodities are not on the critical path all of the time. Table 10 summarizes the sensitivity analysis. The net schedule extension of the case for 20 percent reduction in installation rates for all commodities is 10.2 months.

CRBRP contains 33 percent more work area and 76 percent more work volume than the average 1150 Mw LWR. The peak construction staffing of CRBRP is 2,300 men versus 4,000 for a large LWR. Therefore, the work density at CRBRP is much reduced compared to a large LWR, and flexibility for added worker density or even a second shift is insurance for CRBRP meeting installation rates. It is grossly conservative to consider missing all seven major commodities' installation rates by 20 percent, but even if this unlikely situation occurred, it would be well within the Department Margin.

e. Licensing Changes

No material impacts are anticipated. However, as indicated on Table 7, there is a potential for an impact of up to $11.5 million (for issues identified at this time) that has not already been covered in the estimated cost, although there is very limited possibility of that happening. A current assessment of the exposure would be at that level.

f. Labor Agreement

The Project is proceeding in an area with a large productive labor pool and under a good labor agreement. The area has traditionally experienced few labor delays. No changes of significance are anticipated and no impacts are expected beyond those provided for in time and funding contingency already in the estimates.

TABLE 10

SENSITIVITY ANALYSIS SUMMARY
CONSTRUCTION SCHEDULE IMPACTS DUE TO DECREASED
INSTALLATION RATES 80% AND 90% OF BASE CASE

COMMODITY	DELAYS IN WEEKS 90%	DELAYS IN WEEKS 80%
Concrete	10.7	24.6
Large Bore Pipe	10.8	23.3
Small Bore Pipe	4.4	9.0
Cable Trays	6.5	16.6
Conduit	8.5	22.9
Cable Pull	9.5	21.8
Cable Terminations	10.1	21.9
Net Schedule Extension, All Commodities Considered	15.9	44.2

g. Material Quantities

Due to the advanced stage of design and planning at this phase of the Project, any changes are expected to be within the current time and funding contingencies.

h. Intervention

No anticipated material impact on schedule or funding.

i. Revenues During Startup

The value of the power will be based on actual data at the time of sale. TVA makes frequent revenue projections which vary with their assessments of forecasts on a number of factors. Another consideration is the time period when the power will be sold. Generally forecasts for later periods result in higher estimates.

j. Fuel Cost

A delay in the availability of fuel could extend the CRBR schedule. However, the advanced stage of the SAF facility makes the likelihood small. It is expected that any schedule slip associated with fuel delays would fall clearly clearly within the Department's margin on schedule.

k. Equipment

Due to the advanced stage of procurement and delivery, and of the test program with its positive results, no changes of significance to the cost and schedule are anticipated.

l. Orderly Startup

The Project does not expect difficulties in this area due to the extent of advanced planning for startup which integrates lessons learned from FFTF and LWRs. However, a special contingency of three months is in the schedule should problems be encountered during startup and ascension to power.

2. Summary of Cost and Schedule Swing

a. Cost Swings Associated with Assumptions

These assessments cover potential increases and decreases to the total estimated cost of the Project. They are based on the current schedule for attaining commercial power on September 30, 1990. Accordingly, the Departmental Margin, 15 months, is shown even though funds to cover that amount are available within the $2.5B in the pending legislation.

ITEM	POTENTIAL VARIATIONS IN PROJECT COSTS	
	Decrease	Increase
Escalation (6.5% base)	$105M @ 5%	$ 35M @ 7%
Contingency	0	$ 54M
Licensing Changes	0	$ 13M
Recent Bid Trends	$100M	0
Labor Man-Hours	0	$ 15M
Schedule Change	$ 15M	$ 62 - 123M
Funding Delay	0	$ 45M
Revenues	$ 30M	$ 6M

1. Escalation

This is as stated on the Table. The decrease is based on the OMB projection of 5 percent escalation, and the increase of $35 million reflects the impact of the increasing escalation rate to 7 percent.

2. Contingency

The increase of $54 million would bring the contingency up to the Independent Cost Estimating Team level, however it would not cover the $90M issue discussed in Section IV.B.5.

3. Recent Bid Trends

This is based on bidding experience (excluding steam generators and site preparation which would result in bigger decreases) applied to purchases remaining to be made on the Project.

4. Labor Man-Hours

The Commonwealth Report indicated they estimated the CRBRP would require 21,751,400 direct man-hours and that the DOE estimate was 18,405,000 man-hours. The constructor's estimate includes over 22 million craft-hours, so the probability of an increase in this area is very small. However, ICE still has 1,130,000 man-hours as a potential increase. The estimated cost of those man-hours is $15 million.

5. Schedule Change

The potential increase is associated with the Departmental Margin, $123 million, and is provided for within the $2.5 billion plan. The sensitivity analysis and installation rate experience indicate a period of 8 months may be a more probable outside date. The associated cost would be $68 million.

There is the possibility of finishing the Plant without using all of the three-month Project Contingency which would result in a savings of $12 million.

6. Funding Delay

A 3-month continuing resolution would cause a day-for-day slip estimated to cost about $45 million.

7. Revenue During Startup

TVA has revised downward its revenue projections which could cause the assumed net revenues during startup to be $6 million less than projected. On the other hand, with the marketing strategy under the Alternative Financing Plan, electricity could be sold to other utilities during startup as well as after start of commercial operation. If power is sold during the initial startup at 11¢ per KWH as assumed for the commercial operations period in the Alternative Financing Plan, an additional $30 million could be made available to reduce Project cost.

b. Overall Assessment

Although the probabilities of occurrence vary widely, it is reasonable to conclude that there will be some pluses and some minuses with the final difference being small in tne total.

D. "Any other information or analysis which, in your professional judgment or that of others involved in preparing the cost estimates, should be taken into account by the Congress in its likely attempt to evaluate whether the present cost estimates are reasonable in light of probable future experience, as distinguished from speculation or idealistic hopes."

The following additional information should be taken into account by the Congress in evaluating whether the present cost estimate is reasonable. These points indicate that the estimate has a prudently conservative basis and that the margin built into the Alternative Financing Plan can cover unforeseen increases.

1. The Advanced State of the Project

a. Design is 92 percent complete at start of the construction. On light water reactors, construction is normally started when design is well under 50 percent.

b. Procurements are also far ahead of normal practice at start of construction. Seventy-one percent of the orders for equipment have been placed and close to 50 percent of the equipment has been costed and about 40 percent has been delivered. Most of the CRBRP unique equipment is on order. This leaves the more straightforward off-the-shelf commercial, and bulk items to go. They are easier to estimate and easier to design for.

c. The Prototype Test Program has been extensive and is nearly complete. The equipment has met or exceeded requirements.

d. The Project has established and exercised the procedures to manage, administer, and control the work. This includes a responsive change control procedure.

2. Labor Stabilization Agreement

The Project will be constructed under the Nuclear Power Construction Stabilization Agreement. This is a particularly good agreement and has proven to work very well at the constructor's River Bend site. It is also being utilized now on other nuclear sites. This agreement, along with the productive trained and available work force in the area, gives assurances of a positive environment for construction.

3. Rolling 4x10's Concept

This approach to construction is showing very positive results at SWEC's River Bend Plant. Even with restrictive funding, they are accomplishing nearly 2 percent completion a month. Improvements in productivity have also been realized at River Bend. Very high installation rates are being obtained there. This same concept will be used at the CRBRP.

4. Recent Positive Experience

a. Bid experience over the past 18 months has been very positive with bids more than $90 million under the estimates.

b. The steam generator fabrication was awarded on a firm-fixed price basis on July 2, 1982, and fabrication is proceeding well. The bidding and award was significantly under the Government estimate. This contract also allowed getting the work on a firm fixed-price basis instead of a cost-plus-fixed-fee basis.

c. The site work for the Project was also competitively bid and awarded on a fixed-unit-price basis, at considerably under the estimated cost. Despite extremely adverse weather last fall and winter, the work is on schedule. Over one million cubic yards of rock has been excavated. The Nuclear Island excavation, nearly 100 ft. deep, will be completed in September 1983. All work is on schedule to start placing safety-related concrete in December 1983.

d. Escalation--The marked drop in inflation and escalation is very important to the projected cost to the CRBRP. Forecasters are predicting rates between 5 and 6 percent over the length of the Project. OMB guidance for operating expense projects is about 5 percent. The current project cost estimate is based on 6.5 percent. A single percent in escalation means about $70 million to the Project over its lifetime. Additional significant reductions in the total estimated cost of the Project are predictable with the forecasted escalation.

5. Project Team Experience

The project team involves several of the best contractors in the country on nuclear projects. These contractors are putting top people on the job. Additionally, the Breeder Reactor Corporation and TVA are providing people experienced in design, construction, and startup directly to the Project staff. The Project has the capability of drawing on the expertise of the nuclear industry, as well as the experience of the nation's electric utilities.

6. Licensing

The licensing process has proceeded very well since it was reinstated about 2 years ago. It should produce a Construction Permit by December of this year. This is a recent record for obtaining a Construction Permit. It attests to the advanced state of the design of the plant and its safety. The CRBRP design contains the latest concepts and has been updated to include the lessons learned from Three Mile Island.

7. Funding Availability

The Alternative Financing Plan will have a very positive effect on the project. It will provide private financing for 40 percent of the cost-to-go. It will allow the Project to be planned, implemented, managed, and controlled on a business-like and predictable basis that will permit an effective execution and timely completion.

8. Placement Rates

Recent experience on commodity placement by SWEC at River Bend, along with experience of other light water reactors, gives reason for confidence that with proper planning and attention, the commodity installation rates proposed for CRBRP can and will be met. Recent experience on five selected light water reactors also shows that properly executed projects can and are being completed in the time period set up for the CRBRP.

9. Bechtel

Bechtel has just finished a review of the CRBRP installation rates. They have found that the rates are attainable and that with proper planning and management, the schedule is "highly achievable."

VII. Conclusion

The current cost and schedule assessment to complete the Project can be met if the major assumption of full funding is achieved. In addition, we have determined that the Alternative Financing Plan can accommodate a 15 month increase in schedule as a Department margin.

Shelby T. Brewer
Shelby T. Brewer 9/14/83
Assistant Secretary
for Nuclear Energy

Concur:

Joe LaGrone
Manager, Oak Ridge
Operations Office

Date: 9/14/83

Assistant Secretary,
Management and Administration

Date: 9'14'83

Attachment A

THE SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

August 19, 1983

MEMORANDUM FOR SHELBY T. BREWER
Assistant Secretary
for Nuclear Energy

FROM: DONALD PAUL HODEL DPHodel

The purpose of this memorandum is to outline some of my thoughts concerning the present estimates of the cost of completing the Clinch River Breeder Reactor Project (CRBRP) which have been prepared by CRBRP management and Department of Energy staff.

As you know, one of the major issues raised in the Congress concerning the CRBRP is that of ultimate cost. Under the pending legislative proposal, the federal government will guarantee, among other things, licensing and operability, but the utility participants will have fixed financial obligations. Of necessity, this means the federal government eventually would have to be responsible for any costs of project completion which exceed the presently estimated costs, unless, of course, the federal government were to abandon the CRBRP if and when there is a cost overrun.

In these circumstances, it is absolutely essential that cost estimates be as fair and realistic as humanly possible. Good management practices dictate that the Department make every effort to be sure the Congress has available to it sound data and analyses before making the decision to commit the federal government to completion of the CRBR. More important, it is a matter of the Congress and the Administration having the confidence that we are dealing with this issue in good faith.

With the foregoing in mind, I request that prior to the submission of any Congressional testimony from the Department concerning CRBRP legislation, there be submitted to me over your signature a report containing the following:

(i) A statement of all current information, if any, relevant to the present estimates which might cause a reasonable manager to conclude that the cost of completing the CRBRP might exceed the most recent figure of $2.5 billion (including the $100 million contingency).

(ii) A clear statement of all assumptions made in preparing the present estimates which arguably might be material to such estimates and a further statement describing in a meaningful manner the likelihood that the various material assumptions made will be valid during the entire construction period.

(iii) An explanation of the nature and extent of the likely adverse impacts upon projected costs resulting from described types of failure of assumptions. For example, if only 80 percent or 90 percent of the projected daily pour rates for concrete were to be realized, the respective, expected cost impacts from such failures of assumption should be stated.

(iv) Any other information or analysis which, in your professional judgment or that of others involved in preparing the cost estimates, should be taken into account by the Congress in its likely attempt to evaluate whether the present cost estimates are reasonable in light of probable future experience, as distinguished from speculation or idealistic hopes.

In preparing your report, please fully coordinate your efforts with the Assistant Secretary for Management and Administration and with the Oak Ridge Operations Office. This matter should receive your personal attention on a highest priority basis.

cc: Assistant Secretary Martha Hesse
Mr. Joe LaGrone

Attachment 8

U.S. DEPARTMENT OF ENERGY

memorandum

DATE April 11, 1983

REPLY TO ATTN OF MA-22

SUBJECT Clinch River Breeder Reactor Project Cost Estimate and Schedule Reconciliation

TO Special Assistant to the Secretary

You requested that we meet with Nuclear Personnel, attempt to reconcile the differences in the independent cost assessment and the schedule, and provide you a summary report. This summary report was to include areas of agreement and areas of disagreement with each side presenting their rationale. The report was requested prior to Congressional hearings on the Clinch River Breeder Reactor Project (CRBRP).

The reconciliation meeting was held on April 7, 1983, and additional material was presented on April 8, 1983. Present were personnel from Nuclear Energy, the Acting Project Director for CRBRP and personnel from the Office of Project and Facilities Management, including the Independent Cost Estimating Staff.

Areas of Agreement:

- Status of site preparation (34 percent earth excavation)
- Status of licensing (6 months ahead of schedule)
- Status of total Engineering and Management (82.1 percent based on manpower)
- Status of Plant Design (88.8 percent based on conceptual, preliminary and final design)
- Status of Procurement (70 percent excluding construction)
- Basic agreement on combination of materials and manpower direct costs (less than 10 percent difference)
- Construction planning and project schedules are being revised to reflect restricted funding in FY 1983.

Areas of Disagreement:

The major area of disagreement is on the schedule, from start of construction (completion of site preparation) to criticality. The Assistant Secretary for Nuclear Energy states the period will be 73 months (including 3 months contingency) with criticality December 1989. The Independent Cost Estimating (ICE) Staff feels that based upon a success oriented schedule, the construction period will be 81 months and the total period will be 92 months with criticality July 1991. This is a total 19-month longer period. The rationale for each position follows:

Nuclear:

- CRBR schedule is consistent with well-run nuclear projects that have not been funding constrained.
- CRBR proposed installation rates are based on experience at River Bend Nuclear Plant under same Stone and Webster management approach.
- Design 88 percent complete
- Equipment 75 percent on order, about 40 percent delivered
- Construction contractor on board during design (7 years)
- Licensing ahead of schedule - no outstanding safety issues
- Detailed working model available
- Sound, proven labor agreement
- Will use "rolling 4-10s" approach; more work hours per week
- Available work force
- Good location
    - climate
    - geography
    - transportation
    - public acceptance
- Alternate funding should meet cash flow needs.
- DOE, Administration and Congress has said "expedite."
- Project team has been on board and working, as a team, for years and are dedicated "to make it happen."

ICE:

We utilized an experienced Architect-Engineer for nuclear work, Gilbert-Commonwealth, to conduct a summary bottoms-up review of the CRBRP schedule. The major findings were:

- Installation Rates: Data provided by the project office indicates that CRBRP planned rates are generally in excess of the maximum historical rates for light water reactors and considerably in excess of the typical rates.
- Direct Man-hours: CRBR estimate is 18,405,000; ours is 21,757,400, a difference of 3,346,045 man-hours or 18 percent. CRBR states they have 1,500,000 man-hours in contingency that has not been distributed.

Craftsmen for startup and test were not included. Will require 400,000 to 500,000 craft man-hours.

- Bulk Item Quantities: CRBRP total quantities compare to nuclear units in the 1150 to 1300 MWe range.

  Reservations are expressed on large bore pipe - hangers, snubbers, supports and constraints; large bore pipe welds and small bore hangers where CRBRP has average spacing of approximately 150 percent of other nuclear plants. There is some indication this is being corrected, but not yet factored into the schedule.

- Scope: Several scope items, technical support center, which is required to have a readout capability to monitor the control room; dedicated heating, ventilation and air conditioning (HVAC) for the control room; and testing and startup support are not adequately covered.

- Schedule: The CRBRP construction network has approximately 4700 activities. Of this, nearly 3000 items are either restraints or activities pertaining to cost parameters. Thus, there are approximately 1700 activities representing the total construction and startup effort from late 1982 to the end of 1989. The schedule requires further development of detail to a size of approximately 10,000 activities to allow precise determination of critical path(s) and constraints.

  This low level of detail in the current schedule does not permit accurate determinations of the validity of construction sequencing and reasonableness. CRBR disagrees. Schedule does not show power and control cable pulling and termination activities in the critical path.

  Schedule needs to be integrated with licensing, design and procurement activities. Additionally, a fully detailed schedule for test and checkout must be developed and integrated to ensure every system is completed and released in time to support the test and checkout effort.

  Polar crane erection schedule does not match setting of reactor vessel head.

Gilbert and Commonwealth, from their summary bottoms-up schedule review, feels it will require 110 months for construction, test and checkout of CRBRP to criticality. The ICE Staff, in consideration of all factors, and allowing 10-15 percent increased productivity from the "rolling 4-10s" manning concept, comes to its conclusion of 92 months and criticality July 1991.

Attached are schedule comparisons and installation rates.

There is also a minor disagreement on cost; however, the majority difference ($230 million) follows the schedule difference. The cost comparison through 5 years of operation is:

FEBRUARY 1983

(MILLIONS OF YOE* DOLLARS)

	PROJECT OFFICE 9/82 START SITE PREP. 10/89 CRITICALITY	ICE 9/82 START SITE PREP. 7/91 CRITICALITY	VARIANCE
TOTAL PROJECT INVESTMENT	4,334	4,651	317**
REVENUES	(734)	(661)	73
NET TOTAL	3,600	3,990	390

*YEAR OF EXPENDITURE.
**$317 MILLION DIFFERENCE CAUSED BY:

- o DESIGN EVOLUTION (APPROXIMATELY $101 MILLION ESCALATED).
- o DIFFERENT FACTORS FOR INDIRECT COSTS.
- o INCREASED ENGINEERING SUPPORT IN THE LATER STAGES OF CONSTRUCTION

The alternate funding proposal which was presented to Congress emphasized the remaining funds required to complete CRBR and consumate a 7-month initial shakedown period after criticality. This comparison might be helpful:

(MILLIONS OF YOE* DOLLARS)

	PROJECT OFFICE 9/82 START 10/89 CRITICALITY	ICE 9/82 START 7/91 CRITICALITY	VARIANCE
TOTAL COST TO FINISH (AFTER FY 1983)	2,385	2,771	386**
FUNDS AVAILABLE AT START OF FY 1984	(46)	(46)	0
OUTSIDE CONTRIBUTIONS	(176)	(176)	0
TOTAL TO BE FUNDED	2,163**	2,549**	386

*YEAR OF EXPENDITURE.
**INCLUDES 7-MONTH INITIAL SHAKEDOWN PERIOD.

The difference of $386 million is composed of $230 million based on the schedule difference and $156 million based on different factors for indirect costs and contingency.

In summary, the major disagreement is on schedule. This is important in that some of the alternate financing options to Congress may not be as viable under the longer schedule.

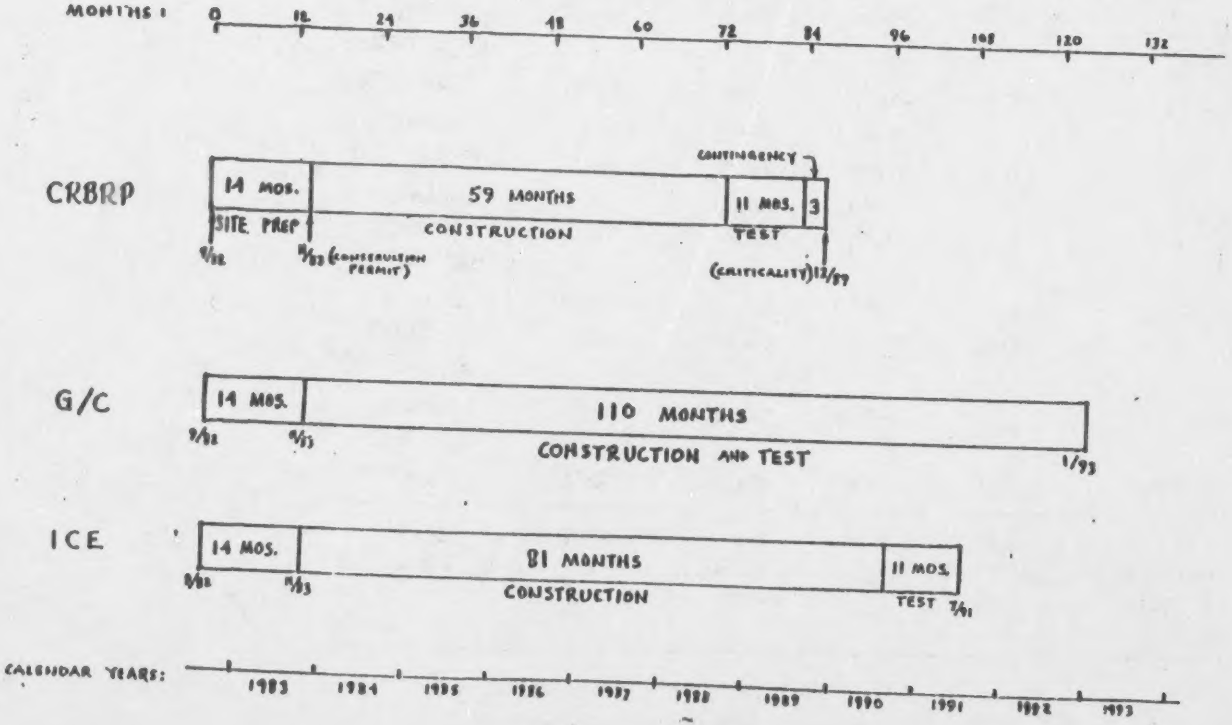
We would be happy to discuss in more detail if you desire.

C. H. Mitchell, Director
Office of Project and
Facilities Management

Attachments

cc:
Martha O. Hesse
William S. Heffelfinger

CRBRP SCHEDULE ESTIMATES COMPARISON



QUANTITY INSTALLATION RATE COMPARISON

(Sustain Average Rate from 10% to 90% complete)

One-Unit Nuclear Plants	Typical LWR (Av. Hist.)	Maximum Historical LWR	CRBRP	CRBRP Ratio to Max. Historical	CRBRP Ratio to Typical
Concrete (CY/MO)	2,800	6,000	8,060	1.34	2.88
Duration		31 mos.	34 mos.		
All Large Pipe (LF/MO)	3,000	4,300	4,045	.94	1.35
Duration		18 mos.	26 mos.		
All Small Pipe (LF/MO)	3,900	6,100	4,760	.78	1.22
Duration		18 mos.	18 mos.		
Cable Tray (LF/MO)	1,400	2,200	6,320	2.87	4.51
Duration		13 mos.	21 mos.		
All Metallic Conduit (LF/MO)	6,100	14,200	17,200	1.21	2.82
Duration		16 mos.	26 mos.		
Wire and Cable (P&C) (LF/MO)	105,000	246,000	268,650	1.09	2.53
Duration		9 mos.	25 mos.		
Terminations (P&C) (EA/MO)	3,900	7,400	16,780	2.27	4.30
Duration		11 mos.	25 mos.		

Attachment C

U.S. DEPARTMENT OF ENERGY

memorandum

DATE: April 12, 1983

REPLY TO ATTN OF: NE-50

SUBJECT: Clinch River Breeder Reactor Plant (CRBRP) Project Schedule

TO: Earl Gjelde
Special Assistant to the Secretary
for Policy and Programs

The Department's Independent Cost Estimating (ICE) Team has been reviewing the CRBRP schedule and cost for the past several weeks. Their preliminary conclusion is that the schedule we are using is too short. That schedule was essentially used as the basis for the Alternative Financing Report forwarded to Congress on March 15. Many points of agreement have been reached and the ICE Team has concluded the basic project cost estimate, before escalation and contingencies are added, is reasonable. However, utilizing a longer construction period would increase the escalated cost estimate. The basic difference in the two results is that our schedule assumes a well run project that is not funding constrained, while the ICE review is based on typical light water reactor experience and gives greater weight to the factors that have caused delays.

The Nuclear Energy schedule for the CRBRP is directed at bringing the reactor on line in a realistic but minimum time frame. This results in the lowest cost to completion and supports the alternative funding approach by minimizing the period of interest costs and by providing the earliest revenue stream from power sales.

The schedule is based on installation experience from the River Bend Nuclear Plant which is also being constructed by Stone and Webster Engineering Corporation (SWEC). Data on CRBRP planning rates and River Bend experience is shown on Attachment A. The total time span from start of construction (safety related concrete) to criticality has been set at 73 months for the CRBRP. This includes 59 months of effective construction, 11 months for final installation and checkout, and 3 months of contingency.

The 73 months is consistent with experience on several domestic nuclear plants that have not been seriously constrained by funding. Additionally, the French have completed 21 reactors in an average of 65 months and the Japanese 5 in an average of 56 months. This substantiates that the schedule proposed for CRBRP is attainable. Attachment B compares the proposed CRBRP project schedule with other experience as well as with the schedules resulting from the independent cost estimate review.

The CRBRP project is well advanced in design, equipment procurement, licensing, and project planning; much further advanced than commercial reactors normally are at start of construction. Additionally, the project's model is much more detailed than those generally used. A skilled work force is available and the location is very favorable for constructing a nuclear facility. The project will be constructed under the Nuclear Power Plant Construction Stabilization Agreement which should provide for construction harmony. The project will also use a two crew rolling 4-10's approach which provides for a regular 70 hours of work per week compared to 40 hours on the regular 5 days of 8 hours each. This relatively new approach to construction is being used by SWEC at River Bend and is being adapted at other reactors. It has demonstrated better productivity plus a capability for higher installation rates. At River Bend even with funding constraints which resulted in manning levels of 1800 per crew instead of the planned 2500, SWEC is attaining very close to 2 percent completion per month. Attachment C covers the factors supporting the CRBRP schedule as outlined above.

The Independent Cost Estimating Team and their consultant, Gilbert/Commonwealth, have reviewed the project schedule. Gilbert/Commonwealth estimates the period at 110 months. They base their determination on data they have available from past experience generally from Public Service of Indiana. We feel that data is not representative of the CRBRP. Additionally, they feel an average of 120 months for 26 U.S. reactors substantiates their longer time projections. We feel that those reactors were stretched out by funding and licensing constraints to the point they are not representative for the CRBRP. The ICE Team reduced the span to 92 months to recognize improvements in productivity through utilization of the "rolling 4-10's" approach. We feel that further reductions should be made to reflect the higher capacities. During the review and subsequent meeting, several questions were raised and points made. Attachment D furnishes responses.

In summary, we feel that the best approach is to complete the CRBRP on the earliest practical schedule. This will also best support the alternative funding approaches. Alternative funding should also provide the cash flow required for a shorter construction period. Further, based on the status of readiness of the project and the experience by SWEC at River Bend, the schedule can be achieved. The schedule for construction has been developed with SWEC corporate involvement and it is the corporate position that it can be met (given the appropriate cash flow). The CRBRP Project Office and Office of Nuclear Energy recommend that the schedule be approved.

Shelby T. Brewer
Assistant Secretary
for Nuclear Energy

4 Attachments

Attachment A

Quantity Installation Rate Basis

	River Bend Experienced*			CRBRP
	Percent Complete	Cumulative Average To Date	Peak Month	Average Sustained Rate From 10% to 90% Complete
Concrete (cy/mo)	88	7,110	10,350	8,060
Large Pipe (LF/mo)	78	6,041	16,108	4,045
Small Pipe (LF/mo)	17	4,161	4,637	4,760
Cable Tray (LF/mo)	56	4,222	7,078	6,320
Conduit (LF/mo)	40	11,385	28,776	17,200
Wire & Cable (LF/mo)	22	256,000	332,422	268,650
Terminations (EA/mo)	9	4,133	15,720**	16,780

Notes: *River Bend construction has been funding limited from April 1981 to date, thus limiting installation rates.

**1983 planned average rate. <10% complete to date.

Attachment B

Comparisons of Schedule Data
Start of Construction to Criticality

	Months
CRBRP Proposed	73
ICE Team Proposed	92
Gilbert/Commonwealth (G/C) Proposed	110
Better U.S. Reactor Experience (9)	60 Avg.
French Reactors (21)	65 Avg.
Japanese Reactors (5)	56 Avg.

Attachment C

THE CRBRP PROJECT
CONSTRUCTION SCHEDULE

- o Stone and Webster has been on board 7 years.
  - They are an experienced constructor of nuclear power plants.
  - They have made detailed constructability reviews and the design has been changed to be more constructable.
  - They have made detailed analyses of the construction approaches and schedules both locally and at corporate headquarters.
  - They have current experience including use of "Rolling 4-10's" construction approach.
  - They feel both locally and at corporate headquarters that the schedule is correct and they are committed to it (subject to availability of funds).
- o The design is nearly 90% complete.
  - Common practice is to start construction when design is much less complete (30 to 50%) and availability of design documents can constrain construction. CRBRP does not have this situation.
- o Nearly 75% of the equipment for CRBRP is on order and about half of that is delivered.
  - The delivered and costed equipment is CRBRP-unique and is the large long-lead-time equipment.
  - Interface data is known and imbeds, loads etc., have been designed for.
  - Equipment remaining to be purchased is generally more standard, more available and smaller. Consequently it does not have the major impact on design nor equal problems with delivery.
  - Lack of interface data for equipment and lack of availability of equipment is often a delaying factor in construction. The status of CRBRP equipment mitigates that problem for the Project.
- o CRBRP licensing is advanced and proceeding exceedingly well.
  - NRC has a projectized and motivated review team and top level interest and attention.

- Progress to date has been outstanding with outlook for a full construction permit this fall
- NRC has been setting and meeting licensing objectives and dates
- No outstanding safety issues remain.
- The advanced state of design provides design-based responses not just conceptual approaches.

o The Project's detailed model will facilitate construction.

- Burns and Roe. the balance of plant (BOP) designer for the Project has developed a detailed model (detailed down to 2" pipe) for use in design and construction. The model is complete including nuclear steam supply designs and equipment as well as BOP.
- This model is much more detailed than models normally used and should materially reduce interferences and conflicts which cause delays in construction of other plants.
- The model is and will continue to be useful to the constructor in visualizing the plant and in developing construction approaches and solving problems.

o The plant will be constructed under the Nuclear Power Plant Construction Stabilization Agreement.

- The Building Trades Department of the AFL/CIO agreed with SWEC in January 1982 to construct CRBRP under this agreement. It provides for:

  Continuity of Construction - No Strike - No Lock Out
  Responsive Arbitration
  Favorable Work Rules
  Off-Site Fabrication

- This agreement should facilitate construction of the CRBRP.

o The Project will utilize the two crew "rolling four tens" approach to construction. Crew A works 4 ten-hour successive days followed by Crew B working the next 4 days for 10 hours a day. Crew A then comes in and alternatingly you get Crew A and Crew B.

  - This provides an effective 70-hour work week compared to 40 hours on the normal 5 days at 8 hours a day This permits a significant increase in the amount of hours that can be worked in a week.

  - Also provides for essentially 52 weeks a year

  - Permits fewer people on site at a shift and accordingly increases productivity (less crowding, etc.).

  - SWEC is using this at the River Bend nuclear job and having good experience including higher productivity and less absenteeism SWEC is averaging completing about 1.9% of the job a month. This of course would equate into a construction period of slightly over 50 months which tends to substantiate our planning for CRBRP.

- o Work force is available, productive and willing.

  - There has been continued work at the DOE facilities for decades. The work force is productive, skilled, and reliable and is used to working on nuclear facilities.

  - TVA's deferral and/or stopping of 6 reactors resulted in the layoff of 5 to 6,000 workers. Many are experienced in nuclear construction. Much of that work force would be available for CRBRP.

  - The Project anticipates picking up experienced salaried personnel from TVA as well. Additionally, experienced personnel are available from the supporting utilities. This site is a good area to live and work in and the Project should not have the problems some of the plants have had in attracting ample skilled people.

- o CRBRP site location is good.

  - Climate is moderate and work can proceed essentially year round.

  - Site has ready access by river, rail and road.

- o CRBRP has community acceptance.

  - The people and local and state governments back the Project. Little if any interference is anticipated.

- One of the biggest delays in LWR's is from licensing changes from discoveries as other plants are licensed, designed, constructed and operated.

  - Delays are frequently encountered in construction of LWR's due to discoveries at other sites. Work is sometimes stopped awaiting changes or retrofitted. CRBRP being the only licensed LMFBR under licensing, construction or operations will not be impacted by off site changes to other LMFBR's. Because areas of similarity with LWR's are limited the impacts from those sites should be small.

- Another big delay in LWR's is restrained funding or cash flow. The CRBRP is being planned around future cash flows being adequate to maintain the plant construction program. The alternative funding approach is planned accordingly.

- Planned construction installation rates for CRBRP Project.

  - Past data presented on the Project have shown planning rates which exceeeded maximum historical LWR rates. For example CRBR rates exceeded LWR rates as follows:

Concrete Placement	1.34
Cable Tray Installation	2.87
Metal Conduit Installation	1.21
Power and Control Cable Terminations	2.27

  - SWEC has attained rates at River Bend which equal or exceed CRBRP rates except in the area of terminations where they have not started work yet but where they plan on essentially the same rate as for CRBRP.

  - Other mitigating factors are:

    - Concrete - CRBRP mat is much thicker and more massive than LWR's as are CRBRP internal walls and slabs. Massive concrete can be poured faster.

    - Conduit - CRBRP has a higher percentage of small conduit. Easier to install.

    - Cable Trays - CRBRP has more standardization in cable tray size.

- Terminations - CRBRP is using multiplexing with more planning for cable lengths and terminations to ease installation.

- DOE and the Congress have repeatedly urged the CRBRP to proceed "expeditiously " Accordingly the Project should be planned and executed on a realistic but ambitious schedule and not approached as an average nuclear power plant construction job.

Prepared by Percy Brewington. Jr.
March 12 1983

Attachment D

Discussion of Independent Cost Estimate Team Questions and Statements

1. **Point**

"Schedule needs to be integrated with licensing, design, and procurement activities."

Discussion

The CRBRP project scheduling system includes all project activities, i.e., licensing, design, procurement, construction startup, testing, and operation at the level 0 milestone schedule and the project level 1 schedule. The reactor manufacturer, architect/engineer (A/E), and constructor each have several more detailed levels of schedules which are integrated into the level 1 schedule and maintained by the Project Office. Every other week the major contractors provide the A/E an update of any interface items which may be late and corrective actions are established. The many recent perturbations of planned funding levels and profiles have resulted in some differences between the project level 1 schedule and the latest construction schedule. When the construction schedule is approved as a base line, the project level 1 schedule will be revised as necessary.

2. **Point**

"A fully detailed schedule for test and checkout must be developed and integrated to ensure every system is completed and released in time to support the test and checkout effort."

Discussion

A detailed and comprehensive acceptance test plan has been developed. The test plan consists of specific test requirements, test specifications including complete acceptance criteria, test scoping data, complete turnover packages and a detailed test schedule. The test schedule specifically addresses completion of the construction and construction testing and the accomplishment of the preoperational and startup tests. The test program provides for all the necessary testing and documentation to demonstrate satisfactory operation of the CRBRP, to confirm the design and construction, and to confirm operating procedures. All the costs for the acceptance test plan are included in the current cost estimate.

3. **Point**

Schedule: The CRBRP construction network has approximately 4700 activities. Of this, nearly 3000 items are either restraints or activities pertaining to cost parameters. Thus, there are approximately 1700 activities representing the total construction and startup effort from late 1982 to the end of 1989. The schedule requires further development of detail to allow precise determination of critical path(s) and constraints. This low level of detail in the current schedule does not permit accurate determinations of the validity of construction sequencing and reasonableness. Schedule does not show power and control cable power and termination activities in the critical path.

Discussion

The construction network will be detailed to a greater level as the funding profile becomes more firm. However, it presently is sufficiently detailed to identify the critical path(s) and major constraints as well as validity of sequencing and reasonableness. The power and control cable pulling and termination activities are included in the construction schedule network but are not currently identified as being on the critical path.

4. Point

Installation Rates. CRBRP planned rates are generally in excess of the maximum historical rates for light water reactors and considerably in excess of the typical rates.

Discussion

The CRBRP planned rates are based on the experience to date and forecast for the River Bend Nuclear Plant that has used the rolling 4-10's approach. This approach utilizes two crews who work successive 4 10-hour days. This results in an effective 70 hour work week compared to 40 hours in a normal 5 days at 8 hours a day. Experience at River Bend has shown increased productivity, reduced absenteeism as well as capacity for significantly higher monthly installation rates. Although construction progress has been restrained by funding levels since April 1981, the experience to date supports the CRBRP installation rates. The rolling 4-10's approach is being proposed for CRBRP. With the availability of alternative funding for the CRBRP, the cash flow should not be constrained and the projected rates should be attained.

5. Point

"o Direct Man-hours: CRBR estimate is 18,405,000; ours is 21,757,400, a difference of 3,346,045 man-hours or 18 percent."

Discussion

The CRBRP estimate includes an additional 1,500,000 direct construction man hours in undistributed contingency. This would give a total of about 19,900,000 direct construction man hours. This plus an additional 380,000 man hours identified in the TVA operating and maintenance account to support startup and testing would bring the totals into close comparison. It is further noted that man hours is a very indirect measure of schedule since much of the work is not on the critical path.

6. Point

"Craftsmen for startup and test were not included. Will require 400,000 to 500,000 craft man-hours."

Discussion

The O&M account includes 380,000 man-hours for TVA craftsmen to support startup and testing. In the future some of this effort may be assigned to the constructor. The effort is covered at nearly the suggested level.

7. Point

"Scope: Several scope items, technical support center, which is required to have a readout capability to monitor the control room; dedicated heating, ventilating, and air conditioning (HVAC) for the control room; and testing and startup support are not adequately covered."

Discussion

Technical Support Building

The on-site Technical Support Center (TSC) is located in the control building overlooking the CRBRP Control Room. It utilizes existing space which is adequate to support the identified support personnel and equipment. The Plant Computer is utilized to provide the necessary data to the TSC.

An On-Site Operational Support Center (OSC) for assembling of support personnel utilizes the lunchroom area of the Plant Service Building and includes communication with the Control Room and the TSC.

The CRBRP will utilize the Emergency Off-Site Facilities (EOF) of TVA. These are the Central Emergency Control Center in Chattanooga, Tennessee, the Muscle Shoals Emergency Control Center in Muscle Shoals, Alabama, and the Knoxville Emergency Control Center in Knoxville, Tennessee, all staffed by TVA personnel. The appropriate communication and data links are provided from the TSC to these EOF's which are the facilities used for all TVA plants.

The costs for the TSC, OSC, and the CRBRP communications and data link equipment to the EOF's were based on a detailed review and cost estimate and are included in the TPCE. Accordingly, the Project has high confidence in the cost and schedule of these items included in the TPCE.

These facilities are described in the PSAR and meet the NRC requirements.

The CRBRP does not have a dedicated HVAC System for the Control Room. The design follows Regulatory requirements which are similar to Control Room design for conventional light water reactors and included with Control Room area is the Technical Support Center and office support for operators. The only differences found in Control Room design is generally the sizing due to heat load. All of these differences have been reflected in the CRBRP TPCE which reflects our present cost and schedule.

Testing and startup support is provided for in the O&M account as noted in Item 6.

8. Point

"Site Preparation: Nuclear-island rock excavation in site preparation is approximately 2 months late. Recovery plan shows almost a month behind schedule."

Discussion

Bad weather in the fall and the time required to provide adequate environmental protection features have caused a delay in the schedule for rock excavation. Although all of that time has not been made up at this time it will not impact placement of concrete nor the critical path. The Office of Project and Facilities Management agrees that there need not be an impact on the schedule.

9. Point

Bulk Item Quantities: CRBRP total quantities compare to nuclear units in the 1150- to 1300 MWe range.

Reservations are expressed on large bore pipe - hangers, snubbers, supports and constraints; large bore pipe welds and small bore hangers where CRBRP has average spacing of approximately 150 percent of other nuclear plants.

Discussion

The report data is based on old information. The CRBRP spacing for large bore pipe hangars, snubbers, and supports is an average of one every 9'. The same is true for small bore supports. These are consistent with other nuclear plants.

Design criteria for the CRBRP provides substantial space envelopes around all piping and components to facilitate installation, operation, and maintenance. This space allocation allows longer piping spools to be shop fabricated and installed with fewer field welds. Further, the CRBRP high temperature environment necessitates the design of thermal expansion loops which can use long, straight lengths of piping with fewer welds. Close-packed piping systems found in large, but lower temperature PWRs would of necessity require a higher unit density of welds. The CRBRP is intentionally purchasing random length piping to reduce both the pipe spool costs and the number of welds.

10. Point

"Polar crane erection schedule does not match setting of reactor vessel head."

Discussion

Agree the crane erection schedule will be changed.

Attachment D

U.S. DEPARTMENT OF ENERGY

memorandum

DATE: Jl 8 1983

EPLY TO
TTN OF: NE-50

UBJECT: Clinch River Breeder Reactor Plant Project Cost Estimate and Schedule Reconciliation

TO: Earl E. Gjelde
Special Assistant to the Secretary
for Policy and Programs

In developing the Clinch River Breeder Reactor Plant (CRBRP) cost estimate and schedule, Nuclear Energy (NE) and Office of Project and Facilities Management (OPFM) utilized different methods with NE focusing on the specifics for the CRBRP Project and OPFM focusing on historical nuclear construction experience. As you will recall, these approaches resulted in a difference in estimate of when the plant would be completed of about 19 months--the OPFM schedule from start of construction to criticality being 92 months and the Project's estimate being 73 months. Both methods produce useful and valid information for use in Project planning.

We believe it is appropriate to ensure that the alternative financing plan include sufficient margin to accommodate the more conservative schedule for Project completion and the beginning of revenues. We also feel that planning and execution of the Project should continue to be founded on the more aggressive but achievable schedule. Accordingly, we will base the Project planning (including milestones, allocation of resources, and value of work scheduled) evaluation, control, and reporting on the NE schedule to maintain contractor discipline. We are currently updating the schedule and estimate to baseline the Project on this basis. We propose that the total plant estimated cost for the Project be based on the minimum schedule and that it not be increased because of the added time contingency for power operations.

We would specifically propose to make provisions in negotiating agreements with the private sector for alternative financing to recognize that commercial power to the grid may be as much as 22 months after scheduled criticality. Current planning is that power to the grid should be available 7 months after criticality. The additional 15-month margin that would be negotiated should provide the kind of assurance that will be required to reach sound agreement with investors. It will not be necessary to revise the report on alternative financing that has been forwarded to Congress.

Additionally, as noted above, the Project Office is currently going through a rescheduling effort and bottoms-up reestimate of the Project. This is being done to reflect the actual funding available in 1983 and the anticipated funding available from FY 1984 through Project completion. There will undoubtedly be some adjustments to the Project schedule included with the estimates. We do not anticipate any significant changes will be required. The Project reestimate will be finished this fall. We will work with OPFM on any baselining of the schedule and cost at that time. However, the approach outlined above does satisfactorily reconcile the major differences described previously on both cost and schedule.

Shelby T. Brewer

Shelby T. Brewer
Assistant Secretary
for Nuclear Energy

Concurrence: MA-22 6/29/83
C. N. Mitchell

Secretary Hodel. First of all, over 90 percent of the design work of this project has been completed. Typically for a light-water reactor, 25 percent or so of the design work has been completed at the time construction permits are obtained. Seventy-five percent of the equipment is on order, and half of that has been delivered.

We have arrangements for a rolling 4-day, 10-hour-a-day workweek which results in a 70-hour workweek being available rather than a 40-hour workweek in order to provide assurance that we can meet the time schedules which are set forth. And time schedules are crucial in projects of this magnitude because of the escalation of costs if you delay the construction.

We have an atypical labor agreement which precludes lockouts and strikes, and which I think is noteworthy. And when Bob Georgine of the Building and Construction Trades Department of the AFL-CIO is before this committee later today, I hope that he has an opportunity to describe to this committee the very important and significant arrangements that have been made which greatly increase the prospects that this project can be constructed as anticipated in a—in a rapid and efficient manner, well within the budget that we've anticipated.

Recently, over the last 18 months, a very important event has been occurring, and that is the estimates of what it would cost for projects, for components of this project have been over the actual bids which we've been receiving. In other words, because of—because of reduced inflation and reduced activity in the business sector, we have been receiving much more favorable bids. And on the average, they've been about 18 percent under the estimates. So that's another factor providing encouragement that the $2.5 billion to completion figure is one we can live with.

Within that $2.5 billion, we include a $216 million contingency and, in addition, have a margin of $123 million in this cost estimate which we will be submitting to the committee. We believe that the key is that we—and this is fundamental—this estimate will be no better than any prior estimate if we don't obtain a stable and reliable funding system so that we can proceed to completion in an orderly and reasonable fashion, rather than the stop-start squeezed financing basis which we've had so far.

Now one of the questions that's raised frequently—is any risk assumed by the private sector investors with regard to the equity investment and the debt?

First of all, on the debt and equity, there is always the risk that an investor takes that—by placing his money in a particular investment at a particular time and interest rate that he will miss the opportunity to move to a more desirable one at a later time in the case of changing circumstances.

The equity investors have additional risks. First of all, they run the risk that investing in these equity securities, they will not have or maintain the tax status which will provide the benefits. We are not asking and not proposing any special tax proposals that these investors would have. Their investment would be subject to the same kind of investment tax credit and tax benefits that any other investment in a comparable, similar construction project would have. There are no special tax incentives that are sought for this project.

The other risk the equity investors take is that, at the completion of the project, when it begins operating, that the power from it may not be salable at a price greater than the amount to pay the cost of interest and debt service, and that there would, therefore, be no return on that equity. That is a risk that they incur.

One of the other questions is—and, therefore, to conclude that point, I think we can say fairly that there is a risk that is being assumed by the private sector in proceeding to do this. In addition, we have the continued commitment of support from the utility sector with the completion of their $175 million additional obligation.

The other question that has been raised is, does Federal exposure increase under the alternative financing plan? And there are risks in both the existing arrangement and in the alternative financing plan for the Government. There is no question about it. If we were able to proceed with the project as presently planned, there would be, of course, not only the full financial burden, but all of the assumed risk about the ultimate salability of the power, and we would be obliged to try to market that within the TVA area under our agreements.

If we are successful with the alternative financing plan, we still have the risk that, if for some reason, we terminate the project or we cannot license it, or we do not operate it for some reason, we do have the obligation to repay the investment that has been made by the private sector under this proposal, because, otherwise, there would be no basis on which any prudent investor would be willing to step forward and assume the risk of something which is totally within the hands and the decision of the Federal Government, and we do know that from time to time governments change their minds.

I think that I should just comment that we believe that if this alternative financing plan obtains congressional approval, that we will be able to put it together, that the very—that the necessary contracts and arrangements can be made, that we can assure a responsible financing program as a result, and that the probability of success is very great, and that we could complete the project within this schedule, and it should be able to be operated.

I think, finally, I need to comment on the question of the level of support which I have for this project, because I have been heard to say under my view of energy policy that the Clinch River project is an anomaly. And I confess that I have said that, Madam Chairman, because I have emphasized that it is extremely difficult for the Federal Government to invest the vast sums that are required to produce development projects on the whole array of exciting technologies in the energy field. And I've suggested that we should limit our activities as part of our energy policy basically to research and scientific activities.

But the reason I continue to support Clinch is that we are well into this project. It very well might be I would not be before this committee recommending that we commence such a project. But we are $1,600 million into this project. It has become symbolic of the commitment of this Nation to a breeder reactor program.

The United States of America is struggling to regain its feet at the nuclear nonproliferation table in the world. Other nations have a significant commitment to the breeder. This Nation's commitment is in doubt at the present time. As you are well aware, recently the British determined that they would collaborate with the French in order to—in order to work on—follow on breeder activities, because they are not certain of what the U.S. level of commitment will in fact be.

The international community which works on breeders and other nuclear issues needs to know that the United States is determined to have an impact on nuclear nonproliferation, and that is an issue that may be overriding in this instance.

But, in addition, this project makes good sense and should be supported at this stage because we have committed so much to it, and it is such a promising technology in this unlimited resource category.

With those comments, Madam Chairman, I can only say that I hope that we really are in fact in the final act of the Clinch River breeder reactor policy debate, and that Congress will have this opportunity for a one-time final decision, yes or no, on this project, and certainly we would hope that the answer would be yes.

[The prepared statement of Secretary Hodel follows:]

Statement of Donald Paul Hodel
Secretary of Energy

Before the Subcommittee on Energy Research and Production
Committee on Science and Technology
U.S. House of Representatives

September 15, 1983

Madam Chairman, I am pleased to appear before the Subcommittee to continue the dialogue on alternative funding for the Clinch River Breeder Reactor Project. As you know, the Conference Report accompanying the FY 1983 Continuing Appropriations Act (P.L. 97-377) directed the Department of Energy to explore alternatives for securing additional private-sector participation in the Breeder Reactor Project in order to reduce the requirement for Federal budget outlays. I will review the actions taken to date to comply with that directive and describe the principal provisions of the proposed Alternative Financing Plan. I will also address certain questions relating both to the financing plan and to the project in general.

Development of the Alternative Financing Plan

In December of 1982, a Utility Task Force was organized under the auspices of the Breeder Reactor Corporation to develop alternative financing plans that would be responsive to Congressional criteria for continued Federal funding of the Clinch River Project. On March 15, I forwarded the Utility Task Force progress report to Congress along with a DOE report on alternative financing for Clinch River.

The financing plan prepared by the Task Force proposed, in effect, for the owners to sell the generating capacity aspect of the project to private investors. The Task Force financial experts estimated that the plan would bring the private-sector contribution for the Clinch River Project to approximately $1 billion, or 40 percent of the estimated cost to complete the plant; this would correspondingly reduce the remaining Federal funding requirements from approximately $2.5 billion to approximately $1.5 billion. The Task Force further believed that the electricity generated from the project could be sold at higher prices than would have been the case under existing arrangements, thereby increasing the revenue stream.

The Task Force report also stressed that any arrangement involving increased private-sector participation would require government assurance that the project would be completed without further delays and would operate successfully. This is a reasonable expectation, since the Federal government would retain the overall management responsibility for the Clinch River Project, and government actions in large measure would determine and control the project schedule and costs.

The March 15 report provided a preliminary outline of a potential funding arrangement, with specific provisions of the funding plan to be developed and further refined. Because the details of an acceptable proposal were not available when Congress passed the FY 1984 Energy and Water Development Appropriations Act (P.L. 98-50), funds for the Clinch River Project were not included. The accompanying Senate Committee report, however, stated that "the Committee is deferring this matter without prejudice." The comparable House Committee report stated that "[i]f an alternative financing arrangement can be worked out, the Committee would consider appropriating funds to continue the project."

Madam Chairman, since that time a more detailed plan has been developed. This plan was delivered to the Department of Energy on June 29, 1983. On July 21, President Reagan, in a meeting with utility and industry representatives, expressed strong support for the proposed funding arrangement, and on August 1, the Department, on behalf of the Administration, forwarded the plan to Congress.

Elements of the Alternative Financing Plan

Private Funds

- The financing plan envisions that approximately $150 million will be raised through equity participation by private investors. In addition to a share of any excess revenues above the requirements for debt service and operation and maintenance, the equity investors would also expect to receive tax benefits not unlike those associated with a similar industrial investment. I am advised that this would include investment tax credits and deductions for interest and depreciation; no tax benefits would be sought on that portion of the project financed with Federal funds. It should also be noted that all income attributable to private investment in the project will be subject to Federal income tax. Although the tax aspect of the financing plan is complex, with both losses and gains of revenue, the Department of the Treasury has advised us that the net effect on the Federal Treasury during the life of this project is expected to be zero.

- $175 million had already been pledged to the CRBR Project by utilities and industry, prior to the development of the Alternative Financing Plan. When added to the funds already contributed, this will bring the total utility/industry contribution to $325 million, the largest private commitment ever made for a single Federal energy research and development project. This is a pure contribution, with no expectation of participating in the benefits of the revenue stream or ownership interest in the project.

- Approximately $675 million (plus interest) is expected to be raised through interim construction borrowing. Potential lenders are largely institutions such as banks, insurance companies, and pension funds. Once construction is completed, it is expected that the accumulated debt, plus interest, would be replaced through the sale of long-term taxable bonds. The repayment of this financing will be based on the sale to utilities of electricity generated by the Clinch River Breeder Reactor and on the Federal government's commitments to successfully complete and operate the project. I am advised that the Task Force believes the projected net revenues should be adequate to support bonds of approximately $1 billion.

Revenues

The net revenues projected by the Utility Task Force from power sales under the Alternative Financing Plan are significantly higher than those available under the current arrangement for two main reasons. First, under the plan, I am advised that it is expected that electricity from the Clinch River plant can be sold to utilities in the South that have large amounts of oil- and gas-fired generating capacity, rather than to TVA at its lower avoided energy cost, which is largely hydro, coal, and nuclear. Second, the project will seek contracts with utilities to sell electricity over 30 years rather than the 5 years now provided for in the existing arrangement. The revenues expected to be received from sales outside the TVA area have been estimated to be sufficient to cover project operating costs and to pay debt service.

I am informed that surveys of utilities in the South indicate reasonable assurance that the electric power generated by the project could be readily absorbed in the 1990's at prices approaching the full market price for replacement power. This gives considerable credibility to the revenue assumptions for the project.

Support for the Alternative Financing Plan

Support for the alternative financing proposal is broad-based. I am advised that four leading Wall Street investment banking firms have endorsed it as a feasible plan with a high probability of success; eleven utilities have expressed interest in purchasing the electric power to be generated by the Clinch River Breeder Reactor, with three of the eleven interested in purchasing about half of the plant's output. In addition, a number of companies have expressed interest in investing in the project, and we have received letters to that effect from twenty-two industrial firms.

On July 21, 1983, representatives of the Breeder Reactor Corporation, the nuclear industry, organized labor, and investment firms presented the Alternative Financing Plan to the President and senior Administration officials. At that time, the President emphasized his strong personal support for the completion of the Clinch River Breeder Reactor Project under the provisions of the Alternative Financing Plan and pledged to work to ensure acceptance and implementation of the financing proposal. We are also pleased by the bipartisan expression of support that this funding arrangement has received from a number of Congressional leaders, as evidenced by a "Dear Colleague" letter dated August 16, 1983.

Issues Raised by the Alternative Financing Plan

A number of issues have been raised about the Alternative Financing Plan. We have tried to address these as forthrightly and objectively as possible. We desire to be responsive to all concerns in working out an acceptable arrangement for completing the Clinch River Project.

I would like to discuss some of the major issues at this time.

- First, does the Alternative Financing Plan sacrifice retention of revenue by the government in the future for assistance in capitalization now? Is there any real cost saving to the government, or are we only moving money around in time, with no net saving?

  The existing arrangement for completing the project anticipates that the net revenues accruing to the government during 5 years of operation of the plant would provide up to $400 million to offset the cost to complete the plant. This would result in a net cost to the government of $1.925 billion to complete the project ($2.5 billion overall cost to complete, less private contribution of $175 million, less $400 million in revenues). In addition, the Federal government would have to sell this plant. The existing arrangement provides TVA with the option to purchase the plant at the market value of the plant to the TVA system. TVA presently contemplates an excess of capacity and has indicated a strong probability that it would not acquire the plant. If TVA does not exercise its option to acquire the plant, the market value of the plant will be diminished, since it is unlikely that other utilities would acquire generating facilities located within TVA's grid.

I am advised that in the Alternative Financing Plan, it is conservatively estimated that the net revenues resulting from the sale of electricity will be sufficient to cover the cost of private financing, i.e., to pay the interest on and retire the debt. Assuming that excess revenues will not be generated, the $400 million revenue stream to the government would be forfeited under the plan, but the cost to complete would be reduced by the $1 billion private investment, yielding a net appropriation required of $1.5 billion. Thus, the net additional saving to the government to complete the construction and demonstration of CRBR from the Alternative Financing Plan is $425 million ($1.925 billion less $1.5 billion).

- How credible is the DOE cost estimate? How would a cost overrun be handled?

Anticipating the need to have a current, credible cost estimate available to support our consideration of the Alternative Financing Plan, I requested that an independent review of the CRBR Project Office cost and schedule estimates be performed. An Independent Cost Estimate (ICE) Team, under the Assistant Secretary for Management and Administration, was commissioned to prepare this assessment. As the assessment proceeded, a number of issues were identified. The key issues, I believe, have been resolved, and we have found that the ICE Team report reinforces our confidence in the estimates. Any residual issues are not thought to have the potential of significantly affecting the conclusion that the project can be completed for approximately $2.5 billion. The $2.504 billion includes the base estimate of $2.381 billion (including about $216 million in contingency) and a departmental margin of about $123 million to cover varying estimates as to when power will reach the electrical grid.

In addition to this independent assessment, after forwarding the Alternative Financing Plan to the Congress, I asked Assistant Secretary Brewer to prepare a report on the cost and schedule issue, fully coordinated within the Department. That report has been completed and will be provided to the Committee. The analysis resulted in some adjustments to the cost and schedule estimate used in the DOE March 1983 report to Congress. These changes increased the total estimated cost to complete the CRBR Project by $41 million and slipped the schedule by 3 months. I am advised that both of these adjustments are well within the parameters of the Alternative Financing Plan's provisions.

Cost increases of the type typically experienced in large construction projects are not expected to have a high likelihood for the CRBR. Design is more than 90 percent complete, over 70 percent of the equipment has already been delivered or is on order, and the NRC is expected to issue the construction permit for CRBR late this year. In addition, special labor contract provisions have been obtained, and a contingency of over $200 million is included in the cost estimate.

As you know, any undertaking of this enormous size and complexity -- whether managed by government, private industry, or the best architect-engineers/constructors in the world -- frequently experiences delays from unforeseen circumstances. Natural phenomena such as weather problems can cause delay; changes in the regulatory process concerning design and safety criteria are unpredictable; and delays can be experienced in obtaining material and equipment from suppliers. These and other factors can change the pace of construction and the ultimate cost of the project. Therefore, neither I nor anyone else can guarantee what will happen from this day forward.

I am sure you are aware of an independent report, prepared for DOE's Independent Cost Estimating team, which arrived at an estimate of the construction period and time required to achieve full-power operation that is at variance with the Department's consensus estimate. This project is therefore like many others, in that "experts" can disagree. On balance, however, I am not presently persuaded that this independent estimate should be regarded as more convincing than the consensus estimate of the Clinch River Breeder Project Office and the Department's Independent Cost Estimating group.

With all of this as background, I believe that the cost estimate of $2.504 billion, which is the consensus position within the Department, should be achievable. This is not to say that there will be no cost increases, but I can say, based on the evidence available today, that it would be reasonable to conclude that we will not experience a cost growth that cannot be accommodated within the estimate of approximately $2.5 billion to complete.

- Is any risk assumed by the private sector under the Alternative Financing Plan?

As I mentioned earlier, under the proposed Alternative Financing Plan, the Federal government would retain complete responsibility for management and control of the project. This is consistent with the fact that the primary mission of the project will remain research and development, even under the revised funding scheme. As such, the private investors would assume no project-related risk *per se*.

The private investors would, however, incur market risks normally associated with investments of this type. They would, for instance, incur the risk that more attractive opportunities may develop which they would have to forego because of their very long-term investment in the Clinch River Breeder Reactor Project. They would risk the possibility of not realizing the anticipated tax benefits should their income tax liability change significantly. Also, I am advised that the uncertainty associated with the realization of revenues in excess of those necessary to cover operating costs and service the debt imposes a risk on the private investors.

- Does the government's risk increase or decrease under the Alternative Financing Plan?

From the viewpoint of uncertainty and risk, I am advised that the government stands to gain significantly should the proposed Alternative Financing Plan be approved and implemented. The benefits will accrue largely as a result of the certainty that will be established with regard to the project funding profile. With the assured availability of appropriated and privately contributed funds, a predictable optimal schedule can be established and maintained, thus eliminating one of the significant sources of cost increase experienced to date.

In very broad terms, I am advised that the General Accounting Office's (GAO) independent assessment of the preliminary and final alternative financing proposals concluded that while the government appears to retain most of the project-related risks, it did not find any source of increased risk to the government above that which already exists. In the worst possible case, GAO noted, the government might have to pay for the Clinch River plant on the basis of the private sector's cost of money instead of the government's cost of money. The added cost, however, would be small and would be incurred only in the unlikely case of complete failure of the project.

- Is completion of the Clinch River Project consistent with the Administration's energy policy?

I would be the first to acknowledge that the developmental nature of this project would tend to classify it as an anomaly among the projects and programs which this Administration desires to encompass within its energy strategy. As an element of energy policy alone, it probably would not be started by this Administration if it were proposed to be initiated today.

Clearly, however, our belief is that this project ought to be finished, since so much time, effort, and money have been expended on it, and since we will most assuredly learn from it things that will help future generations. The completion of the Clinch River Project would fulfill the government's commitment to this long-term, high-risk energy option.

Importance of the Clinch River Breeder Reactor Project

Before closing, Madam Chairman, I would like to step back from the details of the funding for the Clinch River Project to refocus on the significance of this endeavor. Despite frustrations in making progress on the Clinch River Project in the past, today the project is on track and moving well. The design work is more than 90 percent complete. Over 70 percent of the equipment for the plant is on order or already delivered. Licensing activity is proceeding well; the construction permit, which is no longer contested, is expected by the end of the year. Excavation of the nuclear island site is virtually complete, and both environmental and safety hearings are complete.

With the experience gained from the Clinch River Project, the nation will be entering the final phase of its breeder development program. The Federal government will have fulfilled its responsibility of bringing the technology to a point at which the private sector can assume the initiative in making decisions about the prototype demonstration and commercial deployment of the breeder concept. To withdraw from the mission now would be tantamount to closing the door on our most advanced source of inexhaustible electrical energy for future generations.

We must also beware of underestimating the time required to introduce an advanced technology into the industrial system.

Estimates of future energy demand can change dramatically in a short period of time, as we have learned over the past decade. The steady trend in increased use of electricity, coupled with the economic recovery that is daily more evident, could easily prove our electricity demand estimates for the coming decades to be understated. Responsible planning includes energy insurance for the future. An available inexhaustible energy supply option should be a vital element of that insurance.

Of equal importance, our continued participation as a recognized world leader in advanced nuclear technology supports our national nonproliferation objectives. The demonstration of our ability to complete our nuclear development commitments will contribute significantly to our effectiveness at the negotiating table in determining international policies on nonproliferation and nuclear safeguards.

On this basis, I urge your careful evaluation of what we have to gain from completion of the Clinch River Breeder Reactor Project, as well as what we stand to lose if we terminate the project at this point. The Administration is most eager to arrive at an acceptable financial arrangement, and I believe that the Alternative Financing Plan before us has the requisite elements. If we are to avoid further costly disruptions and delays in the Clinch River Project, it is imperative that Congress enact the legislation necessary to implement this plan as quickly as possible. A multi-year appropriation of $1.5 billion of the government's remaining cost, combined with the necessary authority to implement the Alternative Financing Plan, will permit us to establish the stable funding profile necessary to ensure the timely and efficient completion of the project.

Madam Chairman, I look forward to working with this and other Congressional committees to enhance the prospects for long-range energy security. If there are any questions, I will be happy to respond to them at this time.

Mrs. LLOYD. Mr. Secretary, I thank you for a very fine statement. I believe our time should be recorded now as we go into our questioning.

Secretary Hodel, I have before me a letter dated September 14 from Mr. W. B. Shields, who's vice president of Gilbert Commonwealth. And he applies that their analysis of the comments of their July 17 report by the Oak Ridge operation office, and there was some data developed by Burns and Roe and Stone and Webster that certainly could change the conclusion reached in their report.

Would you like to comment on what he is referring to in the letter from Gilbert Commonwealth?

Secretary HODEL. Yes, Madam Chairman. My understanding is that as a part of the ICE, independent cost estimating unit, review which was requested by us this spring, ICE retained Gilbert Commonwealth to give them an estimate of the time to completion of nuclear power projects of comparable size or dimension to Clinch River breeder reactor.

The Gilbert Commonwealth estimate, which was based on light-water experiences, suggested a significantly longer completion time than either ICE or the Department estimates had indicated.

The results of that have been a very intense review of what the differences were between light-water construction requirements and the prospects for this program. And I think the conclusion has been reached by both ICE and our nuclear energy portion of the Department that the estimates on which our $2.5 billion is based are accurate. And I think that the reason is, as I indicated earlier, the design is 90-plus percent complete, the components are 75 percent already ordered—many are already on hand—we have a unique labor agreement, and this project has a number of other benefits. It is sized differently so that there is not the complication of workers on top of each other.

Mrs. LLOYD. Basically, we are further along than most projects would be at this time because of the design work where there are variables in engineering and the components are completed. That this——

Secretary HODEL. That is correct.

Mrs. Lloyd [continuing]. Is certainly not typical of the plans at this time.

There's been a lot of discussion, but I think it is very wise to briefly go over this one more time, Mr. Secretary, because I came to Congress 9 years ago and we were talking about the cost estimates of CRBR at the time. Let's have a brief rundown again of the history of our cost increases since this is very relevant.

Secretary Hodel. Madam Chairman, I can only do a very sketchy job of that personally, off the top of my head.

But it is my understanding that the early estimates when Clinch was under consideration were in the $600 [1] million range that ultimately the first official estimates were in the $900 [1] million range to completion, and that there have then been a series of increased estimates now are pretty much in accordance with what I would say are general escalation in the cost of construction of nuclear powerplants.

The—I have a breakdown of the increases attributable to funding limitations and to other causes which may be of some interest to the committee and I would be happy to submit it. But it indicates that the cost of delay due to funding limitations has been $968 million—call it $1 billion—and that all other causes, design changes, hardened estimates, impact of delaying site work, and so on.

Mrs. Lloyd. You have portrayed these as a result of the political imbalance and political fluctuations?

Secretary Hodel. Some of them. Others are, what?—that first $968 million. The other relates to what would be—would have been cost increases and delays that would have occurred in any project. And that's another approximate billion dollars of increase—$921 million.

Mrs. Lloyd. Mr. Secretary, if you would submit this for the record. I would also like permission to insert my letter from Gilbert Commonwealth also is to be included in our hearings. Without objection, so ordered.

[The information and letter follows:]

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[1] Proper numbers appear in appendix.

Gilbert/Commonwealth engineers and consultants
GILBERT ASSOCIATES, INC., P. O. Box 1498, Reading, PA 19603/Tel 215-775-2600/Cable Gilasoc/Telex 836-431

September 14, 1983

The Honorable Marilyn Lloyd
U.S. House of Representatives
House Committee on Space and
  Technology
Suite 2321
Rayburn House Office Building
Washington, D.C. 20515

Dear Representative Lloyd:

This is to respond to the September 9, 1983 staff query of the Subcommittee on Energy Research and Production regarding Engineering Report R-2524 of Commonwealth Associates Inc., titled "Cost Estimate and Schedule Review for Clinch River Breeder Reactor", dated July 17, 1983. Commonwealth is a subsidiary of Gilbert Associates, Inc.

The Subcommittee staff forwarded Gilbert copies of the July 5, 1983 comments of the Oak Ridge Operations Office of DOE regarding a March 1983 draft of the Report and asked whether the DOE comments had been officially transmitted to Gilbert. As far as we can determine, neither Gilbert nor Commonwealth received a copy of the DOE comments, either officially or unofficially, before September 10, 1983.

The Subcommittee staff also indicated that you would be interested in Gilbert's reaction to the DOE comments. The July 5th DOE letter with attachments comprises more than 50 pages and includes references to a considerable amount of factual information. A cursory review of the DOE comments reveals that, while they include some of the same information that Commonwealth did consider, they also refer to other information that was not available to Commonwealth. An analysis of this information and of the data developed by Burns and Roe and Stone & Webster could change the conclusions reached in the Report.

Yours very truly,

W. B. Shields
W. B. Shields, P.E.
Vice President

WBS/rmc

THE SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

September 7, 1983

Honorable John D. Dingell
Chairman, Subcommittee on
Oversight and Investigations
Committee on Energy and Commerce
House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

I am pleased to supply the information you requested in your letter of August 31, 1983. Your interest in the cost of the Clinch River Breeder Reactor (CRBR) Project is most timely, and I have asked a number of questions in this regard as well. In fact, early this year, I requested that an independent review of the CRBR Project Office cost and schedule estimates be performed. The Independent Cost Estimate Team (ICE), under the Assistant Secretary for Management and Administration, was commissioned to prepare this assessment. As the assessment proceeded, a number of issues were identified. The key issues, I am happy to report, have been resolved and we have found that the ICE Team report reinforces our confidence in the estimates. Any residual issues are not thought to have the potential of significantly affecting the conclusion that the project can be completed for $2.5 billion or less. The $2.5 billion includes the base estimate of $2.381B (including about $216 million in contingency) and a departmental margin of about $123 million to cover the 15 month margin from early to late date for power to the electrical grid.

This conclusion is based on the assumption that the funding profile is stable from this point forward. The Alternative Financing Plan (AFP) is designed to accomplish this, and I hope after your review you will support legislation which enables acceptance of the Plan in Congress.

I am determined to assure that the Congress has the best possible data and analyses available to support its consideration of the Alternative Financing Plan. I have asked the Assistant Secretary for Nuclear Energy to prepare a report, fully coordinated within the Department, on the cost and schedule issue. I will provide that document as soon as it is complete.

If I can be of future assistance please let me know.

Sincerely,

Donald Paul Hodel
DONALD PAUL HODEL

Enclosure

cc:
Honorable James T. Broyhill
Ranking Minority Member

Historical Summary of Appropriations

FY	Proposed Project Office	Proposed DOE	Proposed Administration	Congressional Approved	Cost Impact of Funding Reduction
74	100.3	N/A	100.3	100.3	
75	53.4	N/A	53.4	53.4	
76	152.5	N/A	107.0	107.0	90.0
76T	29.0	N/A	24.1	24.1	
77	237.6	N/A	237.6	237.6	
78	234.8	N/A	234.8 (1) 150.0 (2)	80 0	27.0
79	242.1	-0-	13.4 (3)	172.4	837.0 (6)
80	294.0	-0-	-0-	172.4	
81	196.9	-0-	-0-	172.0	
82	254.0	-0-	-0- (2) 254.0 (4)	193.9	
83	252.5	255.8	252.5	193.9	14.0
84	401.8	370.0	270.0 (5)	-----	-----
				TOTAL	968.0

(1) Ford Budget
(2) Carter Budget
(3) Requested for Termination
(4) Reagan Budget
(5) Alternative Financing Budget
(6) Due to National Policy Debate Delays

HISTORY OF CLINCH RIVER COST INCREASES

	DELAY (Months)	COST OF DELAY (Millions of YOE $)	CRITICALITY	COST (Millions)
1974			July 1982	1,736
	Due to Funding Limitations			
1974 to April 1977	12	117[1]		
National Policy Debate (April 1977 to September 1981)	56	837[2]		
FY1983	1	14[2]		
Sub Total	69	968		
	All Other Causes			
NRC/Licencing Requirements	7	218[1]		
Design Changes/ Hardened Estimates	—	289[1]		
Impact of Delaying Start of Site Work Combined With FY 82 Funding Limitations	12	235		
Other Increases Attributable to Project	—	179		
Sub Total	69	921		
Total	88	1,889	October 1989	3,625
Alternate Financing Plan Contingency for Start-up and Operation	—	160		

[1] DOE/IG-0185 USDOE Inspector General "Report on Audit of the Clinch River Breeder Reactor Plant Project," dated July 21, 1982.

[2] CRBRP-Project office.

Mrs. LLOYD. Aren't you reducing basic demands on the budget by shifting the Government subsidization off-budget and basically providing tax shelter opportunities and Government guarantees as well?

Secretary HODEL. Yes, we are. And to give a direct feel for that, in fiscal year 1984, if this plan went forward, we would anticipate that $200 million would be drawn from the private investors in that first year. And the $1 billion would be spread over the balance of the project. So it would have a direct and immediate impact on appropriations.

Mrs. LLOYD. But there is no provision.

Thank you very much, Mr. Secretary.

Mr. Winn.

Mr. WINN. Thank you, Madam Chairman.

The plan, Mr. Secretary, the plan states that to facilitate the various responsibilities of the partnership, that is, the private investors, which will act on behalf of the joint venture between the Government and the private investors, a new corporation is going to be formed and that's called, I guess, the American Energy Development Corporation.

What role will the Federal Government have in the ultimate decisions of the joint venture and who will decide the operating decisions of the venture?

Secretary HODEL. The operating decisions for the project will remain governmental. The relationship between us and the AEDC will be contractual. We will have to retain the right to make the decisions with regard to all matters affecting construction and operation of the plant, licensing and the like.

It is that reason which requires them to ask for some kind of assurances that we will not jockey around the process within the AEDC itself, the manner in which they raise their money; the instruments by which they do it, that, I would assume, would be their responsibility.

Mr. WINN. OK. If the AEDC has already elected its board of directors, did the fiscal year receive any memberships on that board as a consequence of its investment?

Secretary HODEL. I would not expect that we would have any membership on that board because that board is a conduit for funds coming to us for our use. The manner in which they raise it, and the commitments they make, will be dependent upon the commitments we make to AEDC. They do not—they cannot control the process of the operation of the plant.

Mr. WINN. My understanding that under the plan, power will be sold from the—and you touched on this lightly in your opening remarks—that power will be sold from the facility during the period from 1990 to 2020 to provide revenue for the payback of the bonds to be used to construct the facility.

What utilities—and, if so, could you name a few of them—have indicated that they will buy the electrical power for 11 cents per kilowatt hour as envisioned by the plan?

You mentioned the fact that the Tennessee Valley probably at, early on, can't take any large amounts of power as had originally been envisioned. But it's obvious that in other parts of the country that other ones will, and I just wondered if you could mention some of those.

Secretary HODEL. Mr. Winn, I have a list of utilities which, electrical utilities, which expressed interest such as Allegheny Electric Co-op, Cajun Electric Power Co-op, Carolina Power & Light, Commonwealth Edison, Duke Power Co., East Kentucky Power, Middle South Utilities, North Carolina Electric Membership Corp., Southern Company Services, Inc., which is a large utility in the South; South Mississippi Electric Power Association. And specific quantities of electricity have been requested by North Carolina Electric Membership, South Mississippi Electric and East Kentucky Power of 10, 50, and 100 megawatts each.

So that there is every indication there's a substantial potential market and I would have to say this could not be considered today as a complete list because we have not had a product to sell. We've had a product to test, if you will.

Mr. WINN. But I wanted to give you the opportunity to put those in the record because I think that might well affect the votes of some of the Members of Congress whose utilities are asking for help on this, and they may not be aware of it. They may or may not be.

Secretary HODEL. I appreciate that. Thank you.

Mr. WINN. Thank you, Mr. Secretary. Thank you, Madam Chairman.

Mrs. LLOYD. Thank you very much, Mr. Winn.

Mr. Ottinger.

Mr. OTTINGER. Thank you, Madam Chairman.

Mr. Secretary, the Oversight and Investigations Subcommittee, Mr. Dingell, has turned up documents from Assistant Secretary Shelby Brewer that indicates that just before the vote last year the Department in fact knew that they—scheduling was inaccurate and that the cost estimates were some $300 million over what had been supplied to Congress. In a memo to Martha Hesse, the Assistant Secretary for Management and Administration, Mr. Brewer indicated that this information should be withheld from Congress.

How do you justify that?

Secretary HODEL. I'm sorry, Mr.—I'm sorry, I didn't hear the question. I was looking at the memorandum which I think you are referring to.

Mr. OTTINGER. Well, the memo dated December 13——

Secretary HODEL. Yes, I——

Mr. OTTINGER [continuing]. 1982.

Secretary HODEL. I have that before me.

Mr. OTTINGER. Mr. Mitchell, to Martha Hesse, it stated that the estimates should be $3.917 and not $3.6 billion. But due to the, and I will quote, "Due to the major political problems innovation problems on CBR, at the request of the Assistant Secretary for Nuclear Energy, we have held our ICA close and have not published it."

How do you justify withholding that information just before the vote?

Secretary HODEL. I don't justify it and I think that perhaps the question needs to be asked of Mr. Brewer, our Assistant Secretary who is with me here today. I had no knowledge of this document or of this alleged estimate until much later. It was after the President and I had met with supporters of this project that it was drawn to my attention that the request I made in January for an ICE estimate through my staff had resulted in some disagreement between the ICE and the nuclear energy staff on estimates.

It was then I wrote what I think was described this morning in the paper as a sharply worded directive requesting that those two bodies get together and identify the differences. I did not ask that they get together and agree on an estimate but that they get together and identify the differences so that I could understand for purposes of this testimony and discussion of the project generally what the costs would be.

I can assume that what we were looking at in December was a preliminary estimate, the first cut, if you will, by ICE—and I understand from Mr. Brewer that it was one he had requested ICE to produce. I do not think it is unusual or extraordinary before you have a completed estimate before you have worked out what the problems are with the estimate, what your assumptions were, that you do not scatter it to the wind before you have had a chance to analyze why you have these differences.

When that has been done, both the ICE and the nuclear energy estimate can be explained and come in within the document I have submitted to the chairman earlier together.

Mr. Ottinger. Well, again, in a memo July 5 from Mr. Brewer to Mr. Gilde, it indicates that the time for completion of the project was more than 15 months in excess of that which was supplied to Congress. And the statement is made, "It will not be necessary to revise the report on alternate financing that has been forwarded to Congress."

Secretary Hodel. That is correct. Now, with regard to the time question, which was one that came to my attention in July when I heard of the differences between the Gilbert Commonwealth, the ICE, and the nuclear energy estimates on time, that memorandum which I have referred to was focused both on cost and on time. And I said you have got to come up with an explanation of how these are reconcilable or not.

My understanding is that in the revised estimate, the current estimate, the one that we are submitting to the committee today, that 15 months is taken into account and is included within the time before power can be sold from the project and it still leaves us with the contingencies which I have estimated. So that the cost estimates have not changed significantly from what we have been talking about throughout.

Mrs. Lloyd. Mr. Roe.

Mr. Ottinger. What bothers me is the pattern that emerges here of withholding information that the Department has from Congress.

Secretary Hodel. I would not acknowledge that we were withholding information.

Mrs. Lloyd. The time of the gentleman has expired. Mr. Roe.

Mr. Roe. I thank you, Madam Chairman. I would like to defer at this point.

Mrs. Lloyd. Mr. Valentine.

Mr. Valentine. I don't have any questions, Madam Chairman.

Mrs. Lloyd. Mr. Walker.

Mr. Walker. Thank you, Madam Chairman.

Mr. Secretary, in my opening statement when I referred to the Presidential interest it was not necessarily from the standpoint that I think that we need to have the President get involved. But I think that it is important that while many people talk about the presidential involvement, in many instances the members of this subcommittee have not heard about that interest and, in fact, most of the Presidential discussion of interest has been when certain powerful Senators have seemed to come into play and wanted to talk about the need to continue the Clinch River breeder project.

So my concern is the fact that even though my contacts with the President are somewhat infrequent, over the last several months I have been with him on some occasions. My status as a ranking member of this committee has been well known throughout that period and at no point has the President even mentioned the project to me, let alone lobbying me from the standpoint that this was something that was very important to him.

So I think that that was the tenor of my opening remarks just so that we understand where it's coming from.

Secretary Hodel. Has he talked about natural gas decontrol?

Mr. Walker. No, I haven't heard about natural gas decontrol either.

Secretary Hodel. I will have to work on both those issues. [Laughter.]

Mr. Walker. Yeah, you might, you might want to talk to him about that.

Is there any chance that breeder technology over the next several years is going to meet 20 percent of all of our electrical energy needs?

Secretary Hodel. No.

Mr. Walker. Is there any chance that it's going to meet 10 percent of all of our electrical needs?

Secretary Hodel. No.

Mr. Walker. Then the question that arises in my mind is why can we justify spending 20 percent of the entire research and development budget for breeder technology, including the base program, or in the case of the, just the Clinch River program, spending 10 percent of the entire Energy R&D budget for one project alone?

Secretary Hodel. As I indicated in my opening statement, under the energy policy of this country as I see it, we would not commence such a project today. It is precisely the problem we do have with demonstration projects.

But the answer is we have invested a substantial amount in this project to date. There are very significant international consequences to us if we abandon the Clinch River breeder or the breeder reactor research programs of this country. I think those are in and of themselves sufficient but more importantly, every nation in the free world which is pursuing breeder technology has concluded that it must have an intermediate scale breeder. Japan, France, Britain, Germany, all have or are building intermediate breeder technology.

It is seen by the scientists in this area as an essential step if we are to have ultimately breeder capability. And the potential for breeder, as the chairman indicated in her opening statement, is enormous and significant. And I would point out another very significant portion of our research is going into fusion, which is also a long-range technology, but it has great potential. And I think that is what has committed this country in the past to these programs.

I've come in very much in the middle, or perhaps the end of the debate, on this subject of the Clinch River breeder program. To abandon it now sends all kinds of wrong signals; I think it takes us away from the proliferation table, and leaves the United States dependent on future breeder requirements on other nations.

Mr. WALKER. Well, two comments. Just recently, as you mentioned in your statement, the Europeans have indicated that they are going to go together in a pattern of international cooperation on their breeder programs. And it seems to me that one of the avenues the United States might want to seek to pursue would be to become a part of that international consortium working on breeder technology as one of the options.

Second, it seems to me that the one portion of our breeder program—then it would be important in any kind of international dealings—would be the base breeder program rather than the specific demonstration project.

One of my fears, as I said in my opening statement based upon some information that's come out in the trade press recently is that ultimately the Clinch River program might end up impacting adversely on the base breeder program.

I would appreciate any comments that you might have in that regard.

Secretary HODEL. First, Mr. Walker, let me say that there are those strong supporters of the breeder program who will believe precisely the opposite, that a decision to abandon the Clinch River breeder project will terminate support for the base breeder program because of not only symbolic nature but because of the impasse it places us in the international community.

It is my—I have already begun initiatives, discussions with foreign countries with regard to the base breeder program and international cooperation. What's being talked about there is the large follow-on project which was thought at one time to be the Superphoenix but the cost of the Superphoenix today does not make it commercial, and they are talking about an alternative project.

It seems to me that the reports in the press with regard to the budget are grossly premature. As you know, we are not allowed to discuss the budget concepts that we are working on within the Department and with the OMB. And there's very good reason for that, because what I am sure of is that what has been printed in the paper, or in the periodicals to date, simply will not bear any significant resemblance to the budget which is submitted by the President in January.

But I would submit that at this stage of budget preparation, I can defer certain battles in areas where unknown issues cannot yet be resolved but will be resolved before January with the OMB by the manner in which I submit the document.

Mrs. LLOYD. The time of the gentleman has expired.

Mr. WALKER. Thank you, Madam Chairman.

Mrs. LLOYD. Mrs. Schneider. Pardon me, Mr. Lowery, I believe, is present as a member of the full committee and then we will recognize Mrs. Schneider.

Mr. LOWERY. Thank you, Madam Chairman.

Mr. Secretary, as you know, this committee in the past has required that the private sector shoulder certain risks associated with construction of——

Mrs. LLOYD. Pardon me, would the gentleman speak into his microphone a little better so we can hear you?

Mr. LOWERY. I am. Can you all hear? Is this a little better?

I will have to tell you, I asked that—I was speaking in San Diego in my district during the recess and there was a gentleman way back in the room and he stood up and he said, "Congressman, I can't hear you." A young lady in the front row, and she said, "I can, and I will trade you places." [Laughter.]

I will try to improve the quality as well as the level of conversation.

Mr. Chairman, as I was saying, this committee in the past has required that the private sector shoulder certain risks associated with large demonstration energy projects.

Are there any risks imposed in the private partners of the Clinch River project under your proposed plan, and could you describe them? If there are not, if you would let us know that as well and have the risks involved, the constructing and operating of Clinch River been allocated in a similar manner as has been the case with other Government-sponsored energy demonstration projects?

Secretary HODEL. The risks are several. The utilities are committed to a $325 million contribution at the present time, of which $150 million they have contributed, $175 million remains to be contributed. So there's—that's a risk.

Second, there is the investment risk I referred to in my opening statement where investors will be requested, asked, to assume the risk that this is as good an investment as some other that they might put their money in. And we will certainly have to evaluate when they do that whether the bonds and the notes, whatever they acquire in the way of securities, will hold up in value if there are further assaults or challenges to the completion of the project.

The equity investors not only bear that risk, but they also bear the risk that the power from the project will not be salable for an amount sufficient to cover all costs. And so they bear the risk that they will not get a return on their equity other than the tax benefits which they could expect to get from any investment that they make today and others would presume other such investments would have a higher chance of return. So those are the risks which are involved.

Mr. LOWERY. How about Clinch River in relation to other large-scale demonstration projects?

Secretary HODEL. I am not—I am not, I can't think of any other large-scale demonstration projects offhand where we have a comparable level of private sector investment, something approaching—this would be $1,150 million if we took these numbers out of $3.6 billion project, a very sizable contribution.

I am not saying there aren't any; they just don't come to mind at the present time.

Mr. LOWERY. If there are any that you and your staff determine at a later date, if you would get back to us in writing.

Secretary HODEL. We will also supply—we do have some with a much lesser percentage of contribution in some of the renewable energy areas which I would—we will certainly supply those.

[The information follows:]

The Department previously worked on two other Congressionally authorized large-scale energy demonstration projects which involved cost-sharing by industry. These projects, SRC-I and SRC-II, dealt with the conversion of coal to a clean burning liquid or solid fuel and each had cost estimates exceeding $1.5 billion. The industry's cost share for each of these projects was limited to $100 million and remained at this dollar limitation even though estimated project costs for each project escalated dramatically.

Most other large-scale energy demonstration projects in which DOE has been involved were industry projects which sought some financial support from DOE. These projects, however, were designed, developed, managed, controlled, etc., by private sources, with DOE's involvement being limited to financial support. Included in this group of projects is the Great Plains Gasification Project, which is supported by a DOE loan guarantee; the TOSCO Oil Shale Project, which is now defunct; and the Union Oil Shale Project, which has been transferred to the U.S. Synthethic Fuels Corporation.

Mr. LOWERY. That would be helpful for some perspective.

Mr. Secretary, as you are aware, the Energy Security Act imposed substantial cost-sharing requirements on joint venture partners who seek assistance from the U.S. Synthetic Corp. to build synthetic fuel projects. While Clinch River technology is probably substantially riskier than that type of joint venture scientific—excuse me, or synthetic fuel project, would it not be consistent to impose at least a certain minimal cost sharing on Clinch River partners in accordance with the policy established ADSA?

Secretary HODEL. I think there is quite a difference, Congressman, between the two because in the case of the Synfuels Corp., which, of course, is a separate corporation, not a part of the Department of Energy. But with regard to synfuels, what we have there is a technology which we believe is ready for commercialization. And we are suggesting that as a means of not only getting interest but demonstrating the interest of the private sector, we want substantial contributions. Those aren't demonstration projects in the usual sense of the word. They are intended to be commercial projects with the economic capability of the projects to survive being assured by these price guarantees and loan guarantees.

Clinch River is very much at the research end of the spectrum of demonstration projects. It is an intermediate-size breeder. It is not a commercial-size breeder. It is a step on the path to that.

What you are suggesting, I think, would be far more appropriate—or the question you are raising would suggest if we were going to the commercial scale breeder, there we should be seeking significant private participation because, after all, we expect it to be developed in the private sector.

Mr. LOWERY. We are out of time but——

Mrs. LLOYD. The gentleman's time has expired.

Mr. LOWERY [continuing]. Mr. Secretary, is that assessment realistic as far as synfuels?

Secretary HODEL. I think—yes, I think the assessment is realistic. The question on synfuels is not technology at this time. The assessment—the question is cost.

Mr. LOWERY. Thank you, Madam Chairman.

Mrs. LLOYD. The time of the gentleman has expired. Thank you very much.

Mrs. Schneider.

Mrs. SCHNEIDER. Secretary Hodel, in the past couple of months and weeks we have been watching the full-page ads in the Washington Post for this plan and the first time we saw them a number of us wrote to you asking you to submit legislation just as soon as possible, as did Congressman Dingell, as did Senator Humphrey. And here we are 2 months later, the ads are still running, but we have had no response to our letter, nor have you answered our request to introduce legislation.

I wonder if you could just give me some——

Secretary HODEL. That is correct. But I have—I understand that the—in fact, as you might anticipate in preparation for this hearing, I asked about the status of this correspondence. It was represented to me that largely the correspondence represented a presentation of your points of view but—and I am advised by the staff that answers or comments to those are being prepared and will be submitted.

With regard to legislation, it has not been our—it has not been our view that we can devise the legislative strategy or the language that is essential. We have worked with, I understand, although I have not seen language—we have worked with the Breeder Reactor Corp. proponent and apparently with staff on the Hill to discuss what kinds of language would accomplish the job.

But the reason I have not submitted legislation is that I don't have legislation to submit.

Mrs. SCHNEIDER. You don't have an office and the capability at DOE to provide legislative proposals?

Secretary HODEL. We do, and we have participated, as I indicated. But we do not—I have not seen or received a proposed form of legislation yet which is intended to do the job. That doesn't mean it's not there but I have not been presented with it.

Mrs. SCHNEIDER. Well, it's my understanding that what you have done is not to attempt to draft any legislation with the authorizing committees but, rather, you've been interested in developing the necessary appropriations language that will permit us to move this plan ahead.

Secretary HODEL. Well, I—I should straighten out my statement then. I was not drawing a distinction between legislation and appropriation language. That is what I understand has been worked on.

Mrs. SCHNEIDER. Are you fully supportive of this plan as it sits right now?

Secretary HODEL. Yes, I am. I think it's——

Mrs. SCHNEIDER. Do you think it's perfect?

Secretary HODEL. I would—Congresswoman, I would never—I would never assert that something was perfect. I—life is full of compromises and difficulties. This——

Mrs. SCHNEIDER. Well, let me—excuse me, let me——

Secretary HODEL. I think it is an excellent response to the challenge that was put to us by the Congress to find alternate private sector financing. And I think we've done that very credibly in a large amount.

Mrs. SCHNEIDER. I am concerned that we do have a vote and I am also concerned about my time, so what I've done is restructure my questions so perhaps you could give me a yes or no answer, but to make it easy on you, Mr. Secretary.

Insofar as this plan that you have proposed—if we, the Members of Congress, are given the opportunity to review it, to have debate on it through the authorizing committees, and we were to proceed, do you think that this—would you—and we feel that there are some amendments that ought to be added, would you be supportive of those amendments or changes?

Are you leaving us the opportunity to scrutinize the plan as you have currently submitted it?

Secretary HODEL. I—Congresswoman, I can't answer that question yes or no. Do I have a maybe as well? [Laughter.]

Because——

Mrs. SCHNEIDER. No.

Secretary HODEL [continuing]. I have no idea what amendments you might consider or propose. I cannot buy a pig in a poke but candidly, I don't think I can also—either, I don't think I can tell Congress what is the appropriate mechanism for debating or discussing this issue.

I think we have tried to be open; we have submitted information; we think it is essential that you have it, and I know you will debate it.

Mrs. SCHNEIDER. I would like to pick up on your comment that—about your strategy and being open. I would like to submit for the record, Madam Chairman, from the Nuclear Report, a—the full page——

Mrs. LLOYD. Without objection, it will be made a part of the record.

[The document follows:]

Nuclear Report

A report to the officers and members of the American Nuclear Society of the energy attitudes and the political environment in the capital, prepared by the Washington Representative of the American Nuclear Society.

Vol. VI, No. 7
August 4, 1983

Ronald Reagan pledges full support for Clinch River, and will personally lobby Members of Congress for the passage of funding proposal that will come before both houses late in September. The pledge came in a July 21 meeting in the White House between the President and several breeder advocates, including the immediate past president of the American Nuclear Society, Manning Muntzing. The group had solicited the meeting with the President so it could present him with a copy of "Nuclear Power Assembly: Agenda for the 80s" (See NR of May 5). The session planned was to include solicitations for presidential support for the major points raised in the agenda document—a need for better public understanding of the benefits of nuclear power; implementation of the Nuclear Waste Policy Act of 1982; licensing reform; and Clinch River. The discussion, however, seems to have been somewhat one-sided with the President doing most of the talking. He reasserted his well known position of solid support for nuclear power, and said he firmly believes that the Clinch River demonstration breeder should be built as part of an urgent requirement to keep a world leadership role for the United States in this and other important areas of high technology. This open and positive statement by President Reagan added considerable new optimism to the breeder-advocacy camp, which had been hearing rumors that the administration was paying only lip-service support for the continuation of the CRBR project and that the President was being shielded from this issue by White House staffers who view it as a possible political albatross.

A "Renaissance Event" with Dave Stockman on board. Following the brief session with the President, the breeder advocates conducted detailed discussions about CRBR legislative strategies with top White House advisers and the Secretary of Energy, Donald Hodel. The group from the White House included the President's personal counselor, Edwin Meese, science adviser, George Keyworth, and OMB energy deputy, Frederick Khedouri. Meese chaired the session and called it a "Renaissance Event," in which all members of the administration are in consonance with representatives of industry, labor, and the scientific community (the American Nuclear Society). Khedouri was introduced by Meese as being a "recent convert" to the philosophy of continuing CRBR. These remarks were seen as carrying considerable weight, because it has been widely stated, especially by breeder opponents, that Khedouri and his boss OMB Director David Stockman want nothing more than to see the CRBR project scuttled. In a press conference immediately following the White House meeting, an enthusiastic Hodel said the event had been "a more positive session" than he had anticipated. When asked by a member of the press if the President will lobby Congress for CRBR, making personal telephone calls as he has done in the past on important issues, Hodel said "yes." When asked about where Stockman stands on the new CRBR financial plan, Hodel said: "I can assure you that Dave Stockman is now on board."

Hodel sent the CRBR alternative financial proposal to Capitol Hill on August 1, in time for it to be available to all Members of Congress, giving them an opportunity to discuss it with their constituents during the summer congressional recess, which begins this week and ends after Labor Day. (See NR of July 6 for a more detailed discussion of the proposal). The current strategy is to have the plan before the Congress for a suitable period, with public hearings on it scheduled for the middle of September. The proposal's legislative vehicle will be the continuing resolution to be prepared by the appropriations committees and submitted during the last few days of this fiscal year (before October 1) to appropriate FY-1984 money for ongoing programs not covered by previously enacted appropriations bills. A full appropriation of about $1.4 billion to cover seven years of construction (to project completion) will be offered in the continuing resolution. The CRBR item, most probably, will first be voted up or down in the Senate, where a scant majority in favor of project completion is believed to exist. Such a maneuver could seek to avoid a vote in the House, where "closed" rules often preclude votes on individual items in continuing resolutions.

THE SECRETARY OF ENERGY
WASHINGTON D C 20585

August 1, 1983

Honorable George Bush
President of the Senate
Washington, DC 20510

Dear Mr. President:

Enclosed is the alternative funding plan for completing the Clinch River Breeder Reactor Plant Project recommended by the Administration for consideration and action by the Congress. In the conference report (H. Rept. No. 97-980) accompanying the Further Continuing Appropriations Act for Fiscal Year 1983 (Public Law 97-377), Congress directed the Department of Energy to:

> "...vigorously explore proposals including a reconsideration of the original cost-sharing arrangement, that would reduce Federal budget requirements for the Clinch River project or project alternative, and secure greater participation from the private sector. The Department is to submit its findings to the cognizant congressional committees for consideration by not later than March 15, 1983."

In response to this direction, a task force of utility and investment banking representatives was formed by the Breeder Reactor Corporation. The mission of this task force was to explore prospects for increased private sector financing of the Clinch River Project, thereby reducing the Federal budget requirements to complete the Project. A preliminary task force plan was transmitted to Congress by the Department of Energy on March 15, 1983. It was recognized at the time that further refinement would be necessary before either the Congress or the Administration could determine its acceptability.

Because the final plan was not ready when the Energy and Water Development Appropriations Bill, 1984, was considered by Congress, both Houses passed the bill (which became Public Law 98-50) without funds for Clinch River. As noted in the accompanying Appropriations Committee reports, this action was taken in the absence of a "viable and substantive alternative" financing plan and the Senate committee report clearly stated that "the Committee is deferring this matter without prejudice." Both committee reports took the position that (House wording) "If an alternative financing arrangement can be worked out, the Committee would consider appropriating funds to continue the project."

Since then, the task force has developed a detailed plan which was submitted to the Department on June 29, 1983. I have carefully evaluated this plan and strongly endorse it as a positive means of achieving the objectives of Congress and the Administration.

On July 21, 1983, representatives of the Breeder Reactor Corporation, a consortium of 753 electric utility systems, and the nuclear industry, labor, and investment banking firms presented the plan with their full backing to President Reagan and high-level Administration officials and the President emphasized his strong support for completion of the Clinch River Project. He and his senior officials are committed to support this plan and will work to ensure its acceptance.

The Clinch River Project is a critical element in this vital program to develop the breeder reactor, a technology that can help meet our electricity needs for thousands of years. The potential benefits to our economic future and national security that the breeder offers are enormous, and the prudent course of action would be to take advantage of this very attractive alternative financing plan.

The development of breeder technology is important within the framework of our national energy policy of developing a diverse mix of energy resources because of the strategic importance of electricity and the need to ensure future Americans will have adequate supplies of economic electricity. Industrialized economies are steadily becoming more electrified and this is particularly true in the United States. Over the past decade, while our use of all nonelectric forms of energy dropped by 15 percent, we increased our demand for electricity by 20 percent. Uranium is an important fuel for future growth in baseload electricial capacity, and a long term role for uranium in the Nation's energy mix requires availability of the breeder.

In addition to Clinch River's primary importance to the development of breeder technology, thousands of productive jobs are supported by the Project across the United States and it will enhance U.S. technological strength and nonproliferation influence worldwide. In order to support our nonproliferation objectives through influence on international development of nuclear technology, the United States must be a recognized leader and active participant in the nuclear technologies that other nations are pursuing. Completion of Clinch River will demonstrate to a skeptical world that the United States has the political will to complete its nuclear development commitments, contributing significantly to our negotiating strength.

The design, licensing, hardware fabrication, and site preparation activities required for the Project are all well advanced. All findings resulting from the licensing process regarding plant safety, site suitability, and environmental acceptability have been favorable, and we expect that the Nuclear Regulatory Commission will issue a construction permit and make it effective by December 1983. Construction of the plant is planned to begin immediately thereafter. The advanced stage of design and hardware fabrication combined with the stable funding provided by the alternative financing plan will permit the construction phase to proceed expeditiously towards plant completion in 1989. During the construction phase, peak construction manpower working on the project will be approximately 5,000 people. An additional 17,000 people will be productively employed on supporting Project activities across the United States.

Accordingly, I am submitting formally, with full Administration endorsement, the final task force plan for consideration and action by the Congress. This plan, endorsed by four leading investment banking firms, will raise $1 billion of private capital for the Project, which represents 40 percent of the funding needed to complete Clinch River, and will significantly reduce Federal budget requirements.

Since the Energy and Water Development Appropriations Act, 1984, did not include funds for the Project for fiscal year 1984, the Administration strongly urges the Congress to enact the legislation necessary to implement the Alternative Financing Plan as soon as possible. It is imperative that Congress conclude action prior to the end of the fiscal year in order to ensure that funds for the Project are available to avoid further costly disruptions and delays.

The Department of Energy is eager to work closely with Congress to develop the necessary appropriations language that will permit us to achieve that goal.

Sincerely,

Donald Paul Hodel

DONALD PAUL HODEL

Enclosure

Editor's Notes

1) An identical letter was transmitted to the Honorable Thomas P. O'Neill, Speake of the House of Representatives.

2) The enclosure referenced in the first paragraph of this letter is Appendix C of this report.

Mrs. SCHNEIDER. Thank you.

It says here a full appropriation of about $1.4 billion to cover 7 years of construction will be offered in the continuing resolution. But this evidently is your strategy that the CRBR item most probably will first be voted up or down in the Senate where a scant majority in favor of project completed—completion is believed to exist. And such a maneuver could seek to avoid a vote in the House where closed rules often preclude votes on individual items and continuing resolutions.

Now, I think that what we need to do is to look closely at your motives. I would like to give you the personal assurance that, first of all, DOE—I would like your personal assurance that DOE welcomes a full and open debate on the contents of this cost-sharing plan.

Secretary HODEL. Of course we do.

Mrs. SCHNEIDER. And DOE also is looking forward to having the public debate carried out by Congress with every opportunity for us to examine the contents of that plan and to consider or reject amendments?

Secretary HODEL. I think that it is important for me to emphasize that I am not trying to tell this committee or the Congress how they should proceed to consider this matter. I think that——

Mrs. SCHNEIDER. But is it not true——

Secretary HODEL [continuing]. It is up to committee and it is up to Congress to decide that, and I have not tried to influence that.

Mrs. SCHNEIDER. Well, I question that because of your letter to Mr. Tip O'Neill suggesting that what you do is to move ahead with the appropriations language as opposed to going through the authorizing committees where we would have the opportunity for discussion and debate.

Is it not true that you have written to Mr. O'Neill requesting that?

Yes or no? [Laughter.]

Mrs. LLOYD. The time of the gentlelady has expired but we will have time for the Secretary to answer the question.

Mrs. SCHNEIDER. If you don't have a copy of the letter, Mr. Secretary——

Secretary HODEL. I have a copy of a letter dated August 1 to Hon. Thomas P. O'Neill, Jr., and which sets out the administration task force plan and the closing paragraph says, "We will work closely with Congress to develop the necessary appropriations language that will permit us to achieve that goal." That would suggest a proposal on the part of the Department that it could be handled through appropriations.

Mrs. SCHNEIDER. That suggests, Mr. Secretary——

Mrs. LLOYD. The time of the gentlelady has expired. I believe we do have a vote and we will resume.

Mrs. SCHNEIDER. Thank you.

Mrs. LLOYD. We will resume our hearings in 10 minutes.

[Recess.]

Mrs. LLOYD. The hearing will come to order.

We thank all of you in the audience and all of the participants for their indulgence as we do have to make the necessary votes as members of this body. But we do apologize for the inconvenience.

At this time we will recognize Mr. Dymally.

Mr. **Dymally**. Thank you, Madam Chairman.

Mr. Secretary, as I understand it, the Department has projected a level for future disadvantaged business participation in the project at a little less than $90 million. This figure corresponds to less than 4 percent of the estimated total cost to complete the project.

Would the Department support or be capable of achieving a 10-percent set-aside for minority business participation?

Secretary **Hodel**. Congressman, the only information I have on that is the, I think the same information which you have, which is that the projected future involvement is $88.6 million. It represents a very major increase because previously CRBR past history has been only 1.7.

Mr. **Dymally**. Major from what? That's a relative term.

Secretary **Hodel**. Compared to the earlier portion of this project, yes. And so all the information I have at the moment is simply that it would be $90.3 million estimated total, most of which remains to be accomplished.

I think what this represents is a heightened awareness of the importance we are placing on that whole issue, which I think would be helpful. I cannot—I cannot be sure how many additional spinoff opportunities would come up as a result of these activities. But this, I think, is a conservative and I hope an estimate which we can have some confidence in.

Mr. **Dymally**. The major thrust of my question wasn't answered but I will put it another way.

Let's assume that in the Appropriations Committee or in Conference Committee on the floor as some other matter comes up here for authorization, we put language in for a 10-percent set-aside as was the case of the Alaskan pipeline project which the Department and administration supported.

Secretary **Hodel**. I cannot answer that at this point because I do not know whether that kind of a limitation would put such a restriction on the ability to complete the project that it would impair that ability. But assuming it would not, then I would not have an objection to that.

Mr. **Dymally**. Choice of word limitation bothers me. Mr. Roe's committee, Public Works, recently did that on the transportation bill we just passed as it worked with some success—it has worked with some success on the Alaskan project, and I see no reason why it would not work. I raise this issue, Mr. Secretary, because this week the President is making some very significant but purely symbolic statements about the achievement of a particular minority, the Hispanics, and recently signed legislation to maximize the involvement of minorities——

Mrs. **Lloyd**. Would the gentleman yield?

Mr. **Dymally**. Yes.

Mrs. **Lloyd**. I would like to ask unanimous consent that the Secretary be allowed to look into the issue and provide a statement for the record, if this meets with the gentleman's approval.

Mr. **Dymally**. Fine. Very well.

[The statement follows:]

THE SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

September 23, 1983

Honorable Mervyn Dymally
House of Representatives
Washington, D.C. 20515

Dear Mr. Dymally:

This is in response to your letter of September 17, 1983, expressing concern about the adequacy of the minority contracting associated with the Clinch River Breeder Reactor Plant (CRBRP) Project. In response to your inquiry, we have assessed our efforts to encourage minority contracting for CRBRP, and I believe the emphasis we have recently placed in this regard will increase the level of minority participation to the benefit of both the Project and the minority business community.

We estimate that the cost to complete the Project is about $2.38 billion. This is broken out and categorized in Enclosure 1. We feel that a meaningful and attainable goal can be set and met on the work associated with construction placement which amounts to a total of about $710 million. We also have additional contracts to place for plant equipment, but our experience to date has been that equipment generally must meet nuclear codes and is available only from large manufacturers with nuclear manufacturing experience. Accordingly, we have established a goal of 2 percent, or about $6 million for minority contracting associated with equipment. This goal is set with Burns and Roe, Inc., which is responsible for balance-of-plant equipment, and with Westinghouse, which is responsible for procurement of the nuclear steam supply system equipment. The remainder of the work to finish is generally associated with engineering, administration and management of the Project, and manufacturing and supply of the fuel for the reactor--activities which are already under contract.

The Department is aggressively pursuing the 8(a) set aside program for all of its construction contracts, including CRBRP. Site development on the Project started about a year ago, and we have started work on some of the temporary facilities required to support construction. Two 8(a) set aside contracts in the amount of $235,000 were awarded recently for work associated with the temporary facilities. We have eight additional 8(a) contracts valued at about $4.5million in process at this time which we will award early in fiscal year 1984 if the Project proceeds. Data on these awards are provided in Enclosure 2.

We are confident that we will able to achieve a minority participation level of 12 percent of the construction placement, or about $84 million for a total of about $90 million to complete CRBRP. We are committed to this objective for the Clinch River Project, and would be happy to work with you toward that end. With congressional approval of the Alternative Financing Plan, we will be able to proceed with construction of this important national project. Your support in this regard will be appreciated.

Sincerely,

Donald Paul Hodel

DONALD PAUL HODEL

2 Enclosures

cc:
Honorable Marilyn Lloyd
House of Representatives

Enclosure 1

CRBRP COST ELEMENTS TO COMPLETE

o Engineering, administration and manufacturing services from the Project Office, architect-engineer, reactor manufacturers, constructor and operator and management services	$915M
o Fuel	225M
o Hardware	565M[1]
o Construction placement with assumed distributables	710M
o Revenues from power during start-up	- 35M
	$2,380M

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[1] About $330M remaining to be placed.

Enclosure 2

CRBRP/PO

8(a) CONTRACTS IN PROCESS AS OF 9/13/83

GOODS AND SERVICES	RECOMMENDED CONTRACTOR	ESTIMATED DOLLAR VALUE
1. Construction of Sodium Storage Facility	Vega Corporation Chattanooga, TN	$ 50,000
2. Installation of On-Site Fuel Storage and Distribution Center	Gaiter General Contractors Box 3040 Knoxville, TN 37927	$ 50,000
3. Erection of On-Site Construction Paint Shop	Cummings Construction Co. Memphis, TN	$ 850,000
4. Construction of Pipe Shop, Electrical Shop, Structural Shop, Rebar Shed, Compressor House, and Firewater Pump House	Gaiter General Contractors Knoxville, TN	$ 434,000
5. Erection of On-Site Construction Warehouse	Vega Corporation Chattanooga, TN	$2,340,000
6. Construction of On-Site Cell-Liner Fabrication Shop	F&E Construction, Inc. Knoxville, TN	$ 718,000
7. Installation of Security Fencing	Gaiter General Contractors Knoxville, TN	$ 113,750
8. Janitorial Services for FY 84 for CRBRP/PO, SWEC's OS-3 Facility and OS-3 Building Training Trailer	Colbar, Inc. Knoxville, TN	$ 95,040

Enclosure 2

CRBRP/PO

8(a) CONTRACTS IN PROCESS AS OF 9/13/83

We presently have two 8(a) contracts in place and active as follows:

GOODS AND SERVICES	RECOMMENDED CONTRACTOR	ESTIMATED DOLLAR VALUE
1. Janitorial Services for FY 83 for CRBRP/PO, SWEC's OS-3 Facility and OS-3 Training Trailer	Colbar, Inc. Knoxville, TN	$ 88,683
2. Erection of Quality Control Test Laboratory	F&E Construction, Inc. Knoxville, TN	$ 146,743

Mr. DYMALLY. Madam Chairman, I just want to finish my statement.

The President recently signed legislation with great ceremonial fanfare at the White House which will maximize minority involvement in defense contracts. And it seems to me given the credibility gap that you suffer in the field of minority affairs and civil rights and with women, it may very well be helpful considering the fact that this project suffers from perception and image to indorse this proposal with some enthusiasm.

Secretary HODEL. And particularly if it would assist us in obtaining support for the project as well, Congressman, I think——

Mr. DYMALLY. It might, you can never tell.

Secretary HODEL [continuing]. The combination would be very useful. And I can attest to the fact that we are committed to those programs more than ceremonially but in reality. And I think that this step at this point we did not want to promise more than we were sure we could cover. We would be talking about the completion construction costs portion and I think that we would be very amenable to providing an answer to the record.

Mr. DYMALLY. One final comment. The Chair wants to give you a little flexibility and I agree with her—give you time to think out your position and send me a very strong letter supporting my proposal.

Thank you very much.

Secretary HODEL. Thank you, Congressman.

Mrs. LLOYD. Mr. Dymally, I want to assure that I was not trying to interrupt you——

Mr. DYMALLY. Not at all, I appreciate your help.

Mrs. LLOYD [continuing]. But I thought that was the end of his statement and I certainly appreciate your comments.

Mr. Chandler.

Mr. CHANDLER. Thank you, Madam Chairman.

Mr. Secretary, I have just been made aware of a letter dated yesterday from the Department of the Treasury to Mr. Brewer. This letter in its conclusion says we do not foresee any offsetting losses to the government resulting from private rather than public financing.

Could you comment on the contents of the letter, the questions that you asked the Department of the Treasury and the resulting answers?

[The letter follows:]

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

NT SECRETARY

SEP 14 1983

Dear Mr. Brewer:

Thank you for your letter asking the Treasury Department's analysis of the revenue impact of the Clinch River Breeder Reactor Project. Your letter presents three technical questions, which I will answer directly.

(1) Q. In respect to the tax policy considerations involved in H.R. 3110, is there a difference between cases (a) where the government uses the output of the property and (b) where, as here, the output is sold into the private market?

A. Yes, because H.R. 3110, the Pickle Bill, deals with assets used by governments, and the use of services by governments. By contrast, the power generating assets of the Project would be used for private purposes. If the Pickle Bill were applied to this kind of situation, consumers would either have to pay higher than market price (which is unlikely) or the private investors would not invest as much and the government would have to stand the difference.

(2) Q. Assuming operating costs are equal and electric output and prices the same, is there any net loss to the government from moving ownership of a part of the Project from the government sector into the private sector, as described?

A. No, although there may be some change in the timing of costs borne by the public and private sectors.

(3) Q. Assuming operating costs are equal but that the private owners would, as described, invest an amount which reflects the expectation that they sell the output for more than could the government, is there any gain or loss to the government?

A. There would be a gain to the government. Consumers would be covering costs in the price which the government would otherwise have to cover in expenditures.

Please understand that Treasury makes no judgment about which of the hypothetical cases in questions (2) and (3) is likely to prevail, nor do we draw any conclusions about the desirability of the project from the point of view of private investors. We do not, however, foresee any offsetting losses to the government resulting from private rather than public financing.

Sincerely,

John E. Chapoton
Assistant Secretary
(Tax Policy)

The Honorable
Shelby T. Brewer
Assistant Secretary for
Nuclear Energy
Department of Energy
Washington, D.C. 20585

Secretary **Hodel**. The questions which we directed to Treasury were three. First, that with regard to tax policy, was there a difference between cases where the government uses the output of the property and where as here the output is sold in the private market.

And the answer from Treasury is yes. The—the—it deals with assets used by governments in the use of services by governments. By contrast, says the answer, the power generating assets of the project would be used for private purposes and, therefore, if the Pickle bill were applied to this kind of a situation, consumers would either have to pay higher than market price, which is unlikely; or the private investors would not invest as much, the Government would have to stand the difference.

The second question was, assuming operating costs are equal and electric output in price is the same, Is there any net loss to the Government from moving ownership of the part of the project from the Government sector into the private sector?

And the answer is no, there may be some change in the timing is the follow-on explanation.

The question—third question was: If the operating costs are equal but that the private owners would as described invest an amount which reflects the expectation that they sell the output for more than could the Government, is there any gain or loss to the Government?

The answer is there would be a gain to the Government in that situation. Consumers would be covering costs in the price which the Government would otherwise have to cover in its own expenditures.

Mr. **Chandler**. Would you also comment on the status of the project itself right now; the site preparation, the schedule, how the cost is running?

Secretary **Hodel**. Yes. The—because of the long time this project has been with us, there has been extensive opportunity for prototype testing of the components and that's virtually completed. In excess of 90 percent of the design, the figure we use is 92 percent but I hate ever to be that precise about those kinds—90 percent plus is complete; procurement is over 70 percent, as I have indicated. And the—we've got a contractor who has been on board for 17[1] years, he is certainly experienced in this project. We are getting very close to an operating license—a construction license. And the construction permit is expected in December of this year. Site preparation is about 70 percent complete. That's the ground itself; we've not poured concrete pursuant to directives from Congress. And the nuclear island excavation is virtually complete.

So the project is very much in a ready position provided we can give it the go-ahead.

Mr. **Chandler**. You are, as I am, very familiar with the problems with the Washington Public Power Supply System and the default on those bonds. And I often hear the Clinch River project compared to that one.

My personal view is that the comparison is invalid. I would like to know if you agree and whether you see a difficulty arising in the sale of bonds and the financial government guaranteed bonds on the financial market given the experience that we have had with the Public Power Supply System?

Secretary **Hodel**. Taking your—the last part of your question first, Congressman, I do not, because it has been my understanding that even the supply system bonds which have the Government backing have not had a problem finding a market. It is the non-government backed bonds for the supply system on plants 4 and 5 which have created the problem.

There is another similarity, of course, and that is the failure of will or purpose in a project can be terribly damaging and undermining, greatly increase the costs, cause stretchout of construction, waste efforts, and there are some similarities there partly in the supply system case because of a—of a continuing review and change in the load forecast, which changed the dates of the need of those projects—they were strung out and strung out.

In this case we've had a continuing policy debate for a period of 4 or 5 years which has certainly caused some of the same kind of cost escalations.

The similarities as far as the status of construction are not there at this point, as far as I can tell, because we are at the point of commencement of construction; we seem to have—believe we have a very sound and well worked out construction plan designed essentially complete, and so forth.

Mr. **Chandler**. Thank you, Mr. Secretary, and thank you, Madam Chairman.

Mrs. **Lloyd**. Thank you very much, Mr. Chandler.

Mr. Lundine.

Mr. **Lundine**. Thank you, Madam Chairman.

Mr. Secretary, I guess naively I've been hoping for several years that we could make a decision and either to build this or not to build it.

Under the assumption that we are going to build Clinch River, isn't this actually a more expensive way for the Government to finance the project than it would be to simply directly provide the necessary funds?

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[1] Proper number appears in appendix.

Secretary Hodel. Congressman, I don't think so. And I think the—I think the best response to that is that the Treasury, in responding to the letters on the net effect on the Treasury of this proposal, lends support that it is a wash as far as the cost is concerned. But more importantly at this stage, we are not requiring additional up-front appropriations.

And then, finally, when the project is operating, one of the great advantages is that the power can be sold by the private investors to these utilities I named earlier that are interested in it, at the same time when we would be trying to sell it to the TVA if it were our project, at a much reduced rate. So in fact the power from the project has greater value outside the TVA area.

Mr. Lundine. You correctly pointed out that there were no extraordinary income tax incentives to investors. However, does your calculation that this is a wash include the tax loss in taxes that would otherwise be paid but will not now be paid because of the investment tax credit and other tax provisions?

Secretary Hodel. I—that is my interpretation of the answer the Treasury provided and in which I read into the record, where we assumed equal operating costs. And I asked the question is there any net loss to the Government? And Treasury's answer is no, there may be timing differences but there should be no net loss.

Mr. Lundine. Well, obviously, if we are going to build this, the stability of the financing and being able to proceed on a regular basis is an advantage.

Let me understand the basics here. The $2½ billion that you referred to in your testimony. That's the additional cost; that's not the total cost?

Secretary Hodel. No, that's right.

Mr. Lundine. Now, I understand about the $1 billion from the private sources except that $760—or $675 million interim construction borrowing and then through the sale of the bonds; is that in any way guaranteed by the Government?

Secretary Hodel. Yes, that would have to be guaranteed by the Government in two ways. First of all, if we terminate the plant or don't operate the plant, we would be—because it's with our control, we would be obliged to refund the investment, plus interest.

Now, in the event we operate the plant and the power cannot in fact be sold for a sufficient amount to pay the interest plus the investment we would have an obligation to make up that difference. We don't think that is a great risk if the power is available; we think it can be sold at sufficient. But nonetheless those are the two points.

Mr. Lundine. About the Government's $1½ billion remaining, what makes that any more stable under this proposal than it would have been prior to this proposal?

Secretary Hodel. Well, prior to this proposal, each year's expenditures by the Government had to be appropriated and there was not only the traditional annual problem of—within the administration of reaching agreement on how much could be sought in view of all the other restraints on budget, there is also the problem with Congress as to how much the limited resources could be allocated to this, particularly in the face of resistance in some quarters to the completion of the project.

So it was always in jeopardy. And, as you well, know, appropriations bills are sometimes simply continuing resolutions rather than a full appropriation bill, which means your funding level is the same as last year, it may have no relation in a construction project when you are increased curves. So there's been great uncertainty.

The difference in this proposal is that it is intended to be a onetime final yes/no vote and the appropriations are then committed and locked in in such a way that both we and the Congress are saying that much money is going to be available and you can count on it and you can count on the additional billions. So you now have a certainty which we've never had.

Mr. LUNDINE. Again I make the required to plead naivity but it strikes me that at the State and local government level you have the ideal way to finance of programs such as this. You make a decision whether you go ahead and then you issue bonds for 30 years and you go ahead and you build it.

Now, did you consider that kind of an approach to this and reject it because politically it wouldn't be salable to the Appropriations Committee or something?

Secretary HODEL. No, I did not—I don't recall having considered that. I would not preclude the possibility that my staff considered all kinds of things in addition to those they mentioned to me but in December when Congress gave us directions as to what to do, they said we were to vigorously explore proposals that would reduce Federal budget requirements for the Clinch River project or project alternative and secure greater participation from the private sector. That would preclude, in my estimation, our going with a bonding proposal or borrowing.

One of the questions would be why don't we just borrow money against the future revenues rather than in effect having some other entity do it. A couple of reasons but the—the initial one is that would still be an on-budget kind of thing. It would increase the size of our deficits and affect our ability to reduce them.

Mrs. LLOYD. The time of the gentleman has expired.

Mr. Roe.

Mr. ROE. Thank you, Madam Chairman.

I want to compliment you, Mr. Secretary, on a very adroit presentation because I think for the first time we have before us the reality of what we are trying to deal with. And I realize in respect that there is a great deal of philosophical difference having nothing to do with the integrity or the engineering or the need of power that centers around the nuclear issue, which I don't think we have to rehash, we are all aware of that. So whether—what is it?—More mistakes are made from lack of facts than from poor judgment.

I hope that we don't get bogged down in accredibility of memoranda that has been passed back and forth because those are inhouse documents and it would be a tragedy to have a decision of this magnitude made on that kind of an approach.

I do believe, however, that the chairman—chairlady—had made a very interesting observation in her opening remarks, which I would like to pursue; and I know time is so desperately short.

But I was sitting here listening intently to the methodology of financing and very much interested in the point of view that you selected the 30-year financing aspect of it, because that's continuity of general public financing—correction, private financing, as far as energy is concerned.

On the other hand, when we—we just finished through subcommittee and full Committee on Public Works an enormous step forward in the water resources development program and that legislation which we've pending now going to the floor.

And I think it is important to put into perspective, if there is to be some kind of national policy where energy is involved. And energy is water resources and hydropower. I think it is interesting to bring into focus one, which the chairman did, that we are talking of a 30-year payout and normal private financing. But around here every day in water resources development we don't deal in 30-year financing, we deal in 50-year financing, particularly in hydropower, inland waterway transportation system, court development, has been traditional.

Now, one of the things we have been attempting to do in Public Works is to come back and say, well, if you are going to take 18 years, the average life of a project from beginning to end, if everything goes smooth those 18 years, we project it out and we went into this most intensively, that the cost of the taxpayer because of that 18-year delay is extraordinary. And that is the case—well, I would like to make a comparison there, with the situation we have existing in this particular project. Time delay is a terrible situation in cost, regardless of what the reason may be philosophically or whatever. It has nothing to do with budget. It has to do with determination and decision is what it amounts to. I think that's No. 1.

I think No. 2, and, again, I wish I had attendance but I don't. I would like to say why didn't we look a little to the 50-year payout. If we have—if we have financing that takes place through the whole Federal lexicon of these major water resources/energy projects and we accept 50-year payout, and the fact that there's a 40-year—a 40-percent contribution being made to this program, obviously, you have based the amortization of the private sector on that 30 years; that's what you are speaking to.

Now, two questions. One, the life of the project, again developed by the chairman, is obviously going to be a lot more than 30 years. At least that's what I'm hearing. Is that a correct assumption to make?

Secretary HODEL. We would expect it to be, yes.

Mr. ROE. Yeah. I mean, if we're building a dam and we rebase it—we talk about local participation, we know damn well it's going to last more than 50 years. If it doesn't, we are all in trouble.

I mean, when they built the George Washington Bridge, for example, they built it back in the thirties, it was $122 million—if anybody's seen that seventh wonder of the world. When they added the addition, it was $122 million for the second deck, so there was about $200 million spent. It was an enormous public investment and it's been going on and on and on—if you tried to replace that today it would cost over $1 billion or more, maybe $1.2 billion they estimate.

What I am trying to get at is that if we are developing an energy resource here—and I'm not faulting the 30 years; that's not the point I'm making. But it's certainly reasonable to believe that at the end of the 30 years, somebody rings a bell and the project stops. That's just not accurate.

Secretary HODEL. No.

Mr. ROE. So it's going to last longer than that. Is that a fair assumption?

Secretary HODEL. We would believe it is, yes.

Mr. ROE. Yeah, OK.

Secretary HODEL. I simply can't, obviously, assure it.

Mr. ROE. No, no, no; I don't expect you to do it. I just want to bring the issue into focus.

Secretary HODEL. Post finance benefits.

Mr. ROE. The second point one comes back and says that we are talking about in effect a 30-year short-range amortization of 40 percent based upon what the rates will be of the electricity at that time. Is that a fair assumption?

Secretary HODEL. Over that period.

Mr. ROE. Let me ask this question specifically. How long—let's assume for the sake of discussion that the project goes longer in life than 30 years, and we've amortized our private sector, we've paid that bill off, and we are basing this on a revenue-producing item. This is not some—this is not just something we're building. We are going to produce an income out of it.

Then the next question we have to ask ourselves—indulge in just 1 more minute.

The next question we have to ask ourselves: Has anybody projected?—and I think it would be helpful to the committee. If the life of the project is 50 years and we assume that's reasonable engineering-wise to expect, from best we know today, what would be the continuing revenue flow at that point to amortize the Federal input? Because that would put it in exactly a par position—with our hydro project it would put us in an exact parallel position in Government policies as far as water resources critical to this Nation are involved.

I think it would be very helpful to the committee, Madam Chairman, if we would have a supplemental report coming in from you—and I am not going to aggrandize—it's just a fact. If that program were put into effect and was amortized in a 30-year period, what would be the projection between the 30- and the 50-year period assuming the life of the project—what would be that revenue, and what impact would that have as far as this project would be concerned? In continuity is what we are doing in water resources development.

Mrs. LLOYD. Mr. Secretary, do you agree with this?

Secretary HODEL. I would be happy to try to submit that for the record.

Mrs. LLOYD. So you would submit this for the record, without objection.

Secretary HODEL. I think, Madam Chairman, also you will have an opportunity with one of the later panels to talk about the financing considerations that were made in coming up with this proposal.

Mr. **Roe**. Thank you, Madam Chairman.

Mrs. **Lloyd**. Thank you very much. Thank you, Mr. Roe.

[The information follows:]

If the plant operates for 50 years, and the private bonds are repaid over 30 years, DOE estimates that the revenue stream which may accrue to the government, discounted at 8 percent, would approximate $1.48 billion in constant 1984 dollars. This compares to the additional $1.5 billion government funding required under the private financing plan which discounts to $1.17 billion in 1984 at the same 8 percent discount factor.

Although it has not been determined how the revenue stream will be shared between the government and private sector, we assumed a 75 percent/25 percent split since the private sector is contributing $1 billion of the $4 billion in total estimated project cost.

Mrs. **Lloyd**. Mr. Brown.

Mr. **Brown**. Thank you very much, Madam Chairman, for allowing those of us not on the subcommittee to participate in this.

Mr. Secretary, the original basis under which Clinch River was proposed involved more or less joint sharing of the investment in the risk in this project as I recall. Is that correct?

Secretary **Hodel**. Two-thirds, one-third, Congressman——

Mr. **Brown**. Two-thirds?

Secretary **Hodel** [continuing]. Was my understanding. One-third private, two-thirds Government, yes.

Mr. **Brown**. And as the cost escalated there was no additional increase in the commitment of the private utility sector?

Secretary **Hodel**. That was correct, except as interest accrued on the unpaid portion of their obligation.

Mr. **Brown**. Yes. I think you've frankly described the proposed $1 billion additional investment here not as an additional risk taking except for the risk involved in foregoing alternative investments. Is that correct?

Secretary **Hodel**. On the borrowed portion, that is correct.

Mr. **Brown**. And with regard to the $150 million that is presumably equity investment, that also is protected by the revenues from the project in the event that there are no revenues or what happens? Is that money at complete risk? Is it lost?

Secretary **Hodel**. That is at risk. That money—that is the real risk of the equity portion.

Mr. **Brown**. But this agreement involves the Government undertaking to guarantee that the project will be completed and that that $150 million will be repaid out of revenues.

Secretary **Hodel**. My understanding—and I am listening for a voice behind me saying I'm wrong if I am. My understanding is that the Government is guaranteeing that the plant will operate and that the power can be marketed sufficient to pay the debt portion of the borrowing—of the borrowed money, but that we make no such guarantee that there will be any revenue stream sufficient to make any payments to the equity holders. That's the risk they take.

Mr. **Brown**. So, conceivably there is an additional risktaking of $150 million with regard to this project which would still be nowhere near the one-third/two-thirds that was originally contemplated; is that a fair statement?

Secretary **Hodel**. If we look to that, that would be correct.

Mr. **Brown**. And you indicated that with regard to the cost of this alternative financing, that you thought it was a wash. And it was a wash because of the higher price resulting from the sale of electricity, not the TVA, but to the other investors. There's no net saving to the taxpayers, in other words.

Secretary **Hodel**. I think that's a correct interpretation of what the Treasury has responded to my questions. We wanted their view on that question.

Mr. **Brown**. And you feel that a situation of this sort in which we provide this creative financing and the slight additional risk investment is responsive to the congressional mandate that we explore more equitable cost sharing with the private sector on this project?

Secretary **Hodel**. The language that Congress utilized was that we secure greater participation from the private sector. We clearly have done that with the $150 million which is at risk. We clearly—we clearly have done it insofar as borrowings occur in the loan portion of the investment insofar as that money is—is not investable by those people in other projects which they may—might have thought were more appropriate investments.

Mr. **Brown**. I am not trying to quarrel with this but a number of the communications that I have received questions whether there is either any net savings to the taxpayer or any real increase in equity here. And basically I'm wondering whether or not this matter ought not to be more fully debated in the public and whether the procedures that you are using here are going to preclude such a debate by the public or the Congress in this issue.

Secretary **Hodel**. I—I don't believe that we are using procedures, Congressman, which are—which affect that question. It seems to me that I've—as I've indicated to the chairman, we very much look to the committee and the Congress to determine how this matter should be dealt with. I was advised during the recess—during the vote, by my staff, to point out that the letter that was referred to earlier to Speaker O'Neill which referenced appropriations—reference to appropriations, from our standpoint, we cannot continue to keep the project alive without appropriations.

We are not attempting to preclude the decision by this committee or others that there should be further hearings and, of course, this hearing is a part of that process. I think that's up to the Congress. And I think I've been very consistent with that publicly throughout—that it is not our role to try to dictate to this committee or anybody how Congress should proceed.

Mr. **Roe** [presiding]. The time of the gentleman has expired.

Mr. **Brown**. Thank you, Mr. Chairman.

Mr. **Roe**. The Chair recognizes the gentleman from Florida, Mr. Lewis.

Mr. **Lewis**. Thank you, Mr. Chairman.

Mr. Secretary, you have discussed the financing quite a bit this morning and apparently the proposed financing plan is presumably based on the various projections of the Southeast United States electrical power needs in the 1990's.

Do all of these studies predict increased electrical demand needs during the 1990 period?

Secretary **Hodel**. This is—the answer is, I believe, a qualified yes in that we went out to the utilities in the adjacent areas and said, do you have needs for power which this project might fill? And the—the projections which we have for the region, for the whole Southeast, from the Oak Ridge National Laboratory, is that increase is a very small percentage of the 16,000 megawatts of electric generation required throughout the period in which this project would be around.

Mr. **Lewis**. Earlier we were discussing the cost of power and from our studies and my staff in the Southeast, and particularly in Florida, we are talking about in 1990 about 6.5 cents per kilowatt production. And there you are talking about selling power, I believe, for around 11 cents. And I would like to know what type of commitment you have from the power companies that they are going to purchase power from Clinch?

Secretary **Hodel**. As I said earlier, we do not have commitments. We made a market survey, if you will, to define what the potential level of interest was. I cannot reconcile my understanding of power costs projections in the southeastern part of the country with projection of 6½ cents, did you say, or 16½?

Mr. **Lewis**. Six.

Secretary **Hodel**. Well, I, I—I can't reconcile that because my understanding is that the figures that have been utilized by utilities projecting into the future with escalation run significantly above that. If 6.5 percent—6.5 cents were the price, clearly 11 cents would be too high. It is not believed by us to be a very difficult level to reach power supply.

Mr. **Lewis**. One final question, Mr. Secretary, if you do not have commitments that these companies are going to buy power and it's all based on the possibility that they are going to buy power, how do you feel that you can have a commitment to repay the bond holders as well as have integrity in the financing plan, period?

Secretary **Hodel**. We would have to enter into agreements with utilities as a part of this program to have an out—to have the sale of the project. And what we do have is a report from S. M. Stoller Corp., which indicated that their survey of power costs, the avoided costs—and I probably should reference that. The avoided cost, which is the test we've used under the Public Utilities Regulatory Policy Act, avoided costs for four major utilities surrounding TVA in 1991 is anticipated to be 11.7 cents per kilowatt-hour—that's why I was having trouble with the 6.5. It may well be that the average system cost is lower, but the avoided cost, which would be what Clinch would be competing with, would be at the 11-plus level. We think that gives us a pretty confident base in 1991 at 11.7 to move up.

We would expect to have to enter into agreements with those utilities to provide us the assurance that we would have a market for the power. And until we do that we would not have—we would not have the assurance you are asking for.

Mr. **Lewis**. So that we are coming up with a finance plan with no collateral to pay it back?

Secretary **Hodel**. Well, I think we would obtain the collateral to pay it back. I think that would be part of the process we must go through to pin this down.

Mr. LEWIS. OK. Thank you, Mr. Secretary.

Thank you, Mr. Chairman.

Mrs. LLOYD. Thank you very much.

Mr. Gregg.

Mr. GREGG. Thank you, Madam Chairman.

First, I would like to acknowledge and express my appreciation for Senator Humphrey coming over. I understand he is going to address us and he has certainly been an outspoken and eloquent statesman on this issue. And I being from New Hampshire, I admire his leadership on this matter.

We keep killing this project and it keeps coming back and that's depressing in and of itself. But the form in which it has come back this time is even more depressing. You know, as I see it, it isn't leverage with private funds; this is leverage with tax benefits. And we've been over this a little bit here but one point that I don't think was picked up on, clearly the one factor hasn't picked up on: that's that the initial capital contribution, not the $150 million that's already in, but the $175 million that's about to go in, is going to be totally recovered probably in the first year. In fact, definitely within the first year in investment credits and appreciation by the investors.

So there's actually no cash outlay. Your tax advantages will be a dollar tax advantage and an offsetting tax credit of 10 percent on $1 billion $350 million is approximately $130 million in investment credit but your accelerated depreciation.

Second, the question becomes this is not a $1 billion loan, as I understand it. And I wasn't aware of this until the Secretary discussed this, but it sounds to me like this is a discounted note—that's what really being lent here is $600 million, and if there's $400 million of prepaid interest, which is being returned to the banks and which will be taken by the banks and reinvested immediately because, as I understand it, you are drawing down $600 million on this note with additional money going toward interest. Is that correct? Is this a discounted note, and——

Secretary HODEL. I don't think the way you've characterized it is quite correct and let me say why. It would be my understanding that is in any construction project that the amounts drawn down would be under such a loan commitment would be as needed. In other words, if we would expect to spend as we would the second half of this 1984 fiscal year, $200 million from the loan, but that amount would be borrowed as needed and contributed to the project—that we would not borrow. But I would suggest that this question be raised with the financing panel that will be before you later.

That would be my impression and understanding, we would borrow—the money would be borrowed by AEDC and contributed to us as needed.

Mr. GREGG. Well, was I wrong, then—I thought I heard you say that the net proceeds that was going to arrive in the project from the $1 billion would be $600 million.

Secretary HODEL. No, that—that $675 million figure is correct, but we are talking about over the duration of the construction period loan, would be my impression.

Mr. GREGG. Well, then, as each—well, so as each—it works out the same because——

Secretary HODEL. Yeah, yeah.

Mr. GREGG [continuing]. They are discounting the note as they take down the capital.

Secretary HODEL. That's my understanding, which I think is——

Mr. GREGG. Which means that you are essentially not lending anything that's at risk any longer because you've got your interest back. You—you're—the only thing that is at risk is the underlying capital. But you're not—your interest has been returned which you can reinvest in some other activity and make money on your interest, and it's kiting.

Secretary HODEL. I think not. I think you ought to ask, however, people much more familiar with financing than I am. But I think that's quite an ordinary procedure.

And to go back to your earlier point, this same money invested in research by utilities, or in equity investments by these investors, would do exactly the same—have exactly the same impact on the Federal Treasury as if invested here. So we're not—it is not as if we are saying——

Mr. GREGG. There is a big difference.

Secretary HODEL [continuing]. Do something here that you couldn't do elsewhere.

Mr. GREGG. If I could reclaim my time, Mr. Secretary, there is a substantial difference.

The fact is that the Government is directing the marketplace as to how to invest its energy dollars by doing this because the Government is saying it's going to pick up 75 percent of the cost of this project and it's drawing in a significant amount of private capital that could be used for any variable of activities in the private sector which would flow naturally as the marketplace would set it—as we Republicans would hope the free marketplace would set it as versus how the Government is how the money is going to flow. That's the difference here.

The Government is controlling the flow of the critical research dollars in energy. You know, I might like to see a competitive project in wood, or a competitive project in solar or lowhead hydro. And I think that they'd be more competitive than this project if they didn't have to compete with the fact that the Government were coming in with 75 percent, that they were getting a discounted note up front, and they were getting 200 billion, million dollars' worth of this.

Secretary HODEL. I am sure the Congressman is aware that there are a good many such investments that we assist, including solar and wind, and geothermal, and hydro, in which there are significant Federal contributions to the process from our research and development funds.

Mr. GREGG. Mr. Secretary, I will reserve the opportunity to flay on that issue because as you well know, alternative source energy financing for R&D has been cut to the bones and much of that cut has resulted because of my votes, because I do not think it is the proper role for Government to participate in controlling the marketplace.

The money that's being spent on nuclear and especially Clinch River is a fire—five times what there's being spent in this area.

Mrs. Lloyd. The time of the gentleman has expired.

Mr. Andrews.

Mr. Andrews. Thank you, Madam Chairman.

Just to followup, Mr. Secretary, on my colleague's point in question, why is it, do you think, that this administration appears to have singled out this project as—in—rather than focusing in on the broad range of other alternative energy fuels, such as synfuels, such as solar energy development? Why is it that just this one particular project has created so much attention by this administration?

Secretary Hodel. I think that the administration has not been the focus, has not been the cause of that attention that you refer to. I think it has been the fact that here you have a project that has had Government support. Both Congress and the administration have supported this project right on through, until this last December when it was a very nip-and-tuck battle, as we all know, as to whether it would even survive to look at this process.

Synfuels has an established appropriation and is proceeding, and we do have—and I would welcome the opportunity to discuss, and I am sure I will have many, before this committee and others, to discuss what we are doing in conservation and renewables, and alternative resources, which I think is a responsible plan. I was the first to say that I thought this was an anomaly to our view of how energy policy should proceed. But we have made a major commitment; it is a symbol; it is significant and important. That's why we're willing to go out on a limb contrary to what would be our preferences and say this is an important project that needs to be built, and it is significant internationally as well.

Mr. Andrews. I think to a new Member of Congress that the least compelling reason to support this project is the $1.4 billion that we've already spent on it. To ask—I didn't vote for any of those dollars—and to ask us to spend more because of what's already been spent is not a very compelling——

Secretary Hodel. Well, Congressman——

Mr. Andrews [continuing]. Is not a very compelling argument.

Secretary Hodel [continuing]. I have never testified in behalf of Clinch River before either, but I find myself, after having reviewed the record, convinced that this really is an important and appropriate project.

Mr. Andrews. In—in May, after the House voted to basically kill the project unless the private sector came forward, you stated about 6 weeks after that vote that our energy program could make do without the $4 billion nuclear project. You were paraphrased as that by the Los Angeles Times.

Is that—would that be a correct assessment?

Secretary Hodel. I don't know what new—without Clinch? I don't know what the reference would be unless it was my general statement about the current projected requirements for a breeder reactor. I have made no bones throughout that—about the fact that we do not have to have a breeder reactor available as commercial technology this year, next year, or the like.

We are not talking about that either. We are talking about a project that could be finished in 1990—its intermediate technology. It is a step in the direction of making the breeder realistic as a commercial technology, as the chairman indicated.

So I was—it may well have been out of that context. Nobody is suggesting, that I am aware of, that we would have to have a breeder for today's power requirements. Nobody's suggesting that.

Mr. ANDREWS. If we fail to vote for this project, what kind of wrong signals does that send? I mean, who do we signal by that vote?

Secretary HODEL. I think several signals are sent. First of all, there's the ongoing question of whether a free democratic society has the ability to make a commitment to a long-term, high-cost project with varying analyses coming during the life of the construction period and see it through. Very great question about that—one of the reasons I indicated, the British decided they could not wait for us any longer because they don't know where we're going. We're still welcome. If we want to play as a part of the international breeder community, we are still welcome, but we have to bring something to the table in the way of technology and a commitment.

This would clearly signal we're out of that. And that means to me that the decisions about what proliferation rules will be applied to people building breeders with French or British technology will not have significant United States input. I think that's unfortunate.

So it seems to me we send that signal about whether we're serious about being a participant in that program. It clearly has that symbolism and I think that's because both the supporters and the opponents of the project have increasingly focused on it. In and of itself it might not have had that significance 2 years ago or whenever, but now it certainly does seem to have that and the whole base breeder program may very well be dependent upon it as well.

Mr. ANDREWS. Do you believe our Nation has the same sense of commitment on other energy programs, solar energy development, for instance?

Secretary HODEL. I do. Yes, and I think one of the things if you—I think I've been consistent from the day I became involved with the Department of Energy in emphasizing that one of the most serious problems I have is maintaining the momentum on conservation and renewable projects at a time when the perception is we've got some kind of glut. I don't believe that glut is very significant and we must not change energy policy based on it.

So I think it's imperative that we keep conservation and renewables alive. But I also think we need to press on the other technologies as well—we are talking about fusion, and breeder, and coal development, and the like—all of them.

And I think I've been quite consistent and strongly supportive of all of those.

Mrs. LLOYD. The time of the gentleman has expired.

Mr. Harkin.

Mr. HARKIN. Thank you, Madam Chairwoman, and I, too, want to express my appreciation to you for allowing those who are—of us who are not on the subcommittee to sit and listen, and also to participate.

Mr. Secretary, I just wanted to followup on a couple of questions that Mr. Brown was asking you.

It seems that the case of the taxing and the benefits that come about—and also following up on what Mr. Gregg was questioning about—the alternative financing plan calls for the investment of $150 million in equity capital. Those who invest will be entitled to receive the tax benefits on that money; also on the $675 million that is to come through borrowing; and the $175 million from the funds already committed by the utilities.

Secretary **Hodel**. Not on that; not on the $175 million from the utilities, I believe. In other words, on the borrowed amounts and the equity, yes. But my understanding is it would not be on the $175 million or the other $150 million that's already been contributed by the utilities.

Mr. **Harkin**. Well, it said here, they said they received—on page 18, in paragraph 2, they would receive all of these incentives. Typically associated—these incentives would be measured by the entire private investment, entire private investment. Is not the $175 million part of that entire investment?

Secretary **Hodel**. The $175 million and the prior $150 million is a contribution from utilities, a research contribution. It is not termed within the—within investment. It's not counted as investment.

Mr. **Harkin**. I see. So that then on the investment, $150 million, they will get—they will receive tax benefits on the $150 million plus the $675 million?

Secretary **Hodel**. Right. I need to emphasize that I believe utilities obtained some kind of tax credit or tax benefit from contributions to research. So—but that's not in the same category.

Mr. **Harkin**. OK. I'm told that under this system—and this is what Mr. Gregg, I think, was alluding to—for every equity dollar invested, gives you almost 7 dollars worth of base for tax purposes. The investors could get back $270 million in just 3 years from the U.S. Treasury on a $150 million investment, about an 80-percent profit. Is that true?

Secretary **Hodel**. I do not know. I don't have those figures and I don't understand it that way but I do think that is the kind of question that needs to be asked of the finance panel—financial panel because, presumably, they will have made those analyses in order to determine that they have marketable securities.

Mr. **Harkin**. Well, with the tremendous leveraging that the plan allows, I understand that the equity investors can eventually expect up to $600 million back from the Treasury, which would be about a 400-percent profit on taxes alone. Is that correct?

Secretary **Hodel**. I do not know that to be true and I think it's important to emphasize that any interest that's paid in this, of course, is a taxable return on the part of the investors.

Mr. **Harkin**. Well, I just—I—I mean, this is a very important part.

Secretary **Hodel**. But I can't reconcile those numbers with the statement from the Treasury——

Mrs. **Lloyd**. Will the gentleman yield?

Secretary HODEL [continuing]. That there's no net effect on the Treasury.

Mrs. LLOYD. Will the gentleman yield?

Secretary HODEL. I have trouble with that but perhaps this financial panel could help with that.

Mrs. LLOYD. Would the Secretary like to refer to our letter from the Treasury, on the Department of the Treasury, in this instance?

Secretary HODEL. Madam Chairman, I previously read that—parts of that letter in and, and of course, I don't have the—I don't have the Treasury background sufficient to go beyond the scope of the letter itself. But I do think that the financial panel people would very much be able to respond to this because I am sure in evaluating the salability of the debt and the equity, they have had to calculate those kinds of things and could probably answer definitively.

Mr. HARKIN. Also, the plans say that DOE will indemnify the investors against any changes in the tax laws; is that right?

Secretary HODEL. I——

Mr. HARKIN. Page 2, paragraph 1.

Secretary HODEL. Oh, yes. Excuse me, yes.

It is my understanding that that would be against a change in the tax laws but not—but it does not assure, necessarily, the tax rulings that are necessary to make the bonds salable.

Mr. HARKIN. Do you know if your office has examined this financial structure to see if it would fall under H.R. 3110? It's a bill introduced by Congressman Pickle and passed by the Ways and Means Committee, which limits the tax advantages of leases, leasebacks, and other financial arrangements with government entities? Do you know if that's——

Secretary HODEL. It was one of the questions we asked Treasury; it was the first question—of the three questions that we asked them. We asked if there was a difference between this case and the cases covered by the Pickle bill. My understanding of their answer is they say, yes, there is a difference.

Mr. HARKIN. That yes?

Secretary HODEL. There is a difference. This is not covered by the Pickle bill, is my interpretation of the answer.

Mr. HARKIN. Would not be under the Pickle bill?

Secretary HODEL. Yeah.

Mr. HARKIN. OK. That would be interesting to find out because it looks like that bill is going to be coming through pretty soon.

Lastly, again on the question that Mr. Brown asked, I wonder if maybe you didn't misspeak or I just didn't understand it. Again in the appendix to the report from the breeder reactor corporation under No. 1, it says that governmental contracts to provide sufficient funds to repay all construction loans private equity and other investments in the project.

His question was that you said that the private equity was at risk but it seems here that there is absolutely no risk at all. It says that the Government contracts say that assurances that will be made.

Secretary HODEL. My understanding is that if the plant is terminated before it goes operable through our doing, one way or another, we do have that obligation. That would be—we would be obliged to repay everything. If the plant goes operable, the risk then shifts to the equity holders.

The point is they are assuming the risk of the salability of the value of the power. They are not assuming the risk of the Government once again changing its mind on where it stands on a major project.

Mrs. LLOYD. The time of the gentleman has expired.

Mr. Skeen.

Mr. SKEEN. Thank you, Madam Chairwoman.

I want to also express my gratitude for an opportunity to be here and to listen to this and to make comments.

Mr. Secretary, I appreciate the work that you've done this morning. I think you've explained very well the alternate financing program and this is one that the challenge was thrown down to the Secretary by the Congress.

My colleague from New Hampshire expressed some frustration that we've killed, in his words, we've killed this program several times and it keeps coming back.

Those of us who support the program also are a little frustrated but we are delighted to see that a good program is not going to be killed, no matter what the procrastination, the delay, the mastication, the emasculation, the truncation, the bifucation, or whatever else is taking place in this body, to hold this project up.

We support it because we believe in full fuel cycle development for the United States, and let's get on with it. We have messed around long enough. The objections from this body through two Congresses have been economic. The challenge was given to you and to members of the Department of Energy to come up with an alternative financing plan and I want to—I want to congratulate you on doing just exactly that.

Secretary HODEL. Thank you.

Mr. SKEEN. Now we're getting to Byzantine arguments and the convoluted logic about, well, what's happened with all the bookkeeping? So we are going to get immersed into that.

My concern is just delay. What has been the effect of delay on this project costwise right from the start? We've contributed our fair share of that. But I also would like to know to what effect does any more delay have on the alternative financing plan?

Secretary HODEL. The—I indicated earlier, Congressman, that the delay—the cost of delay, has approached $1.0 billion, by our calculations.

Mr. SKEEN. That's a good jaw full at anybody's expense.

Secretary HODEL. Yes; that's a little better than half of the total projected cost as we now see it as a result of delay. And clearly, what we are proposing in the way of an alternate financing plan is absolutely dependent upon the assumption made which is we are going to have a yes or no vote, obviously made on the assumption we will have a yes vote on this proposal which gives us the ability to be confident of the future funding is absolutely essential.

If, in spite of that, there are delays thrown in through other congressional activities or the money is not made available by us for some reason, we can't assure the completion of the project or these numbers.

Mr. SKEEN. So this is either do or die?

Secretary **Hodel**. I like to think of it as a one-time final shot, yes or no——

Mr. **Skeen**. Final shot.

Secretary **Hodel** [continuing]. And we will either have a project to complete or we won't, but I can go worry about some other issues.

Mr. **Skeen**. Well, I am sure that probably both sides of the argument here, even in Congress because we couldn't find something else to chew around on, would be also happy to know that we are going to have one shot.

But I do want to thank you once again and thank the Department for the work that you've done; and also the chairlady that proposed this idea—I think that she's done an outstanding job. Thank you very much.

Mrs. **Lloyd**. We all thank you.

Mr. Gore.

Mr. **Gore**. Thank you very much, Madam Chairman.

I appreciate the opportunity to participate here. I am a member of the full committee, though not of this subcommittee, and I appreciate the fact that you've made it possible for us to participate.

Secretary Hodel, you are an extremely able advocate and I am just delighted you are on the right side of this issue.

Secretary **Hodel**. I'm glad you are. [Laughter.]

Mr. **Gore**. Much of the criticism from those who are not has focused on the economic viability of the project and the likelihood that there will not be a market for the electricity.

It seems to me it would be far more appropriate to look at the project as what it is: a research and development program with the potential for great payback in the future as opposed to an immediate revenue-producing project.

Wouldn't you agree with that?

Secretary **Hodel**. Yes, I have looked at it that way. But the questions I've gotten, as you say, have been on finances so I've been responding to those.

Mr. **Gore**. Yes; well, now, as a research effort, does Clinch River stand this administration's test for investment of public research funds?

Secretary **Hodel**. It's a close question. And the reason I say that is that—that we are trying hard to move our activity in energy to the research end of the spectrum. And there is a component here of development in this project, which is why I have used the word anomaly in the past in describing it. But I get, frankly, a very strong argument from the proponents of the breeder, and Clinch particularly, that this is essentially a research project. It is an absolute essential step.

It is not a demonstration of the commercial technology; it isn't sized for that, it isn't designed for that. So it's still on the research end and you can make the argument that's been made to me: it really is a a research project.

Mr. **Gore**. Yeah. Well, now, a lot of people who participate in this debate which has been going on for so long, seem to be very certain about their assumptions. They seem to know for sure what the future of energy supply and demand is going to be in the United States and the rest of the world. But it seems to me that if we have learned anything from the last 30 years, it is that there is a tremendous amount of volatility in the energy supply and demand area. And we are caught by surprises from time to time.

In fact, we have a habit in this country of going through this cycle from extreme crisis and urgency on one occasion; and then a few years later we are just relaxed, and everything is fine, and we don't have to really keep pushing the projects that were begun during the last period of urgency and crisis.

And if we are going to really solve the energy crisis once and for all, we've got to realize that it's not just a short-term event, it's something that is going to be with us for quite some time.

Now, there have been some changes in the wake of the last period of crisis and urgency. It is true that the multiplier between GNP growth and energy consumption has shifted—we've made an enormous investment in efficiency.

But isn't it true that the demand curve for electricity is very different from the demand curve for energy as a whole?

Secretary HODEL. I assert that it is. I can get an argument in certain quarters when I make that assertion. But I believe that we will find that as the economic growth continues, that economic growth and electric requirement growth will remain quite close in conformity——

Mr. GORE. Yeah.

Secretary HODEL [continuing]. Unlocking energy and GNP growth——

Mr. GORE. Yeah.

Secretary HODEL [continuing]. Which we've done in some ways, is tied, I think, very much with the fossil fuel side.

Mr. GORE. Well, in fact, electricity is an energy source of preference, or an in-use source of preference, and you've seen a more rapid growth than in other kinds of energy.

Another area of uncertainty: Do you feel confident that we now have a clear view of exactly what all of the environmental problems are connected with a massive increase in the use of coal for the generation of electricity?

Secretary HODEL. No.

Mr. GORE. Well, some of the opponents of the breeder seem to feel fairly comfortable about that. We don't even—we haven't even begun to assess the magnitude of some of the environmental problems associated with fossil fuels. Some of them we just put into another category altogether and say we will worry about that later. CO_2 problem is one of those. Nobody wants to think about that.

What if—what if the leading scientists in the country are right about the CO_2 problem? We might see this Nation and many others pushing rapidly toward a greater utilization for substitutes for fossil fuels. Acid rain—we are seeing a tremendous controversy in the Congress, in this session of Congress, and next year about what to do or that's on your desk right now. And some of the same people are pushing to do something about that and we have to solve that problem. But, again, that's an area of uncertainty that I think ought to lead us to continue with the pursuit of the research and development embodied in this project.

My time has expired, Madam Chairman. I appreciate your courtesy.

Mrs. **LLOYD**. We will allow time as I have with previous questioners, to allow the Secretary to make a reply.

Secretary **HODEL**. Well, I concur, and I feel it is across the board, every energy technology. If suddenly—if it suddenly became the energy technology for America, we would have to look at what its consequences would be because of the massive infusion. It's true of coal, it's geothermal, wind alike. We would want to look at that. And I feel we need to keep pushing on the whole expanse of opportunities, and breeders certainly has to be included as one of those along with all of the renewables and the others.

Mr. **GORE**. Thank you.

Mrs. **LLOYD**. Thank you very much.

Mr. MacKay.

Mr. **MACKAY**. I have no questions, Madam Chairman.

Mrs. **LLOYD**. Mr. Secretary, I believe there are no further questions for you but I do want to thank you and members of your staff that are with you for a very excellent job that you have done. You have certainly been very well prepared. You've answered our questions with great accuracy and great—with great—a real grasp of the issues that we are discussing today.

I would like to state that if any member has questions for the record that I would hope that they would alert the subcommittee staff so that they can assimilate them into a unified package to be presented.

Again, thank you again for appearing before us this morning.

Secretary **HODEL**. Thank you, Madam Chairman, and members of the committee.

I appreciate the opportunity to talk about this project and you've provided just that.

Mrs. **LLOYD**. We thank you for being here.

Secretary **HODEL**. Thank you.

Mrs. **LLOYD**. I would also, at this time, like to welcome Senator Humphrey who is with us this morning and he will be before us after our next panel of Members of Congress. Thank you for being here, Senator Humphrey.

Our next panel, Congressman Wolpe, who is a member of our full committee, and also Congressman Sid Morrison, Representative from Washington, who is also—correction, Mr. Wolpe is on leave of absence from our committee. We welcome you back today, Howard, as well as Representative Morrison. Both of you have expressed a very keen interest in energy technology and we look forward not only to your insight but for your—also your replies to the questions that we will have for you. Please proceed.

STATEMENTS OF HON. HOWARD WOLPE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN, AND HON. SID MORRISON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON

Mr. **WOLPE**. Thank you very much.

It is a pleasure once again to be participating at least in a different capacity but to be participating in the proceedings of this subcommittee.

As a member of this panel during the 96th–97th Congress, as you know, I was a consistent critic of the Clinch River breeder reactor project. I must say that my recent experience as a member of the Budget Committee has even further convinced me that the Clinch River project is a perfect example of the kind of unjustified Government spending that must be eliminated if we are ever to effectively reduce the soaring Federal deficit.

Although we have been up and down this road many times in the past I think it is important to review some of the events that have led us to this point.

The Clinch River project was authorized by Congress in 1971, a time when many energy forecasts indicated that there could be a need for considerable additions to the Nation's electric generating capacity by the end of the century.

The initial cost estimate of the plant was $699 million, including a $257 million private investor contribution which accounted for 36 percent of the anticipated costs.

I have over here on this chart on the left, a well-worn chart that is probably familiar to many members of this committee, a portrayal of what has happened to those projected costs. By 1981, the cost of the project had soared to $3.2 billion and construction had not even begun. The private investor contribution, however, have remained at $257 million, only 8 percent of the project's estimated cost. Even more importantly, it had become obvious that the assumptions in which the project was originally based, were no longer valid. It turns out that the demand for electricity has not grown anywhere near as rapidly as had been forecast when the project was originally justified. It turns out there were far more substantial supplies of uranium in place than had been thought at the time.

In short, the breeder reactors would have been—would under the new economic realization, would be unable to compete in the commercial marketplace for at least 40 to 50 years.

In a time of increasing fiscal austerity, it became difficult to justify spending billions of taxpayer dollars to prematurely demonstrated technology that would be obsolete long before it would be able to compete in the marketplace with existing nuclear technologies .

I might add that the GAO has found that the total project cost could reach $8½ billion. The sum total is that the Clinch River project has defied fiscal logic and has managed to hang on by a thread; at times a thread that's really the product of some very creative manipulation of the numbers. I would draw your attention in this instance to the Washington Post story today describing the request for a Hill investigation of the manipulations that were involved in DOE forecasting of costs when this matter was last before the Congress.

Finally, as a consequence of this growing skepticism and awareness of the changing economic conditions, this Congress recently demanded that there be a whole new cost-sharing arrangement developed if there was going to be any Federal participation in the completion of this effort.

And then on March 8 to 15, 1983, the Department of Energy released its cost-sharing proposal. The congressional response at that point was somewhat less than enthusiastic. The plan proposed that private investors contribute 40 percent of the remaining estimated cost of the project to reduce Federal outlays during its construction. But the taxpayer would have had to guarantee that the private investor would receive a return on their investment. In effect, the private investors would not have had to accept any additional risk beyond the original $257 million that they pledged in 1971.

In a nutshell, the $1 million study proposed a cost-benefit financing arrangement in which the private investor would be guaranteed benefits and the taxpayer would be stuck with the cost.

On May 3, Secretary Hodel, presented this proposal to Congress. However, it was determined the project's—by the project's supporters the proposal would never fly. It was not formally introduced as legislation and scheduled hearings and markups were canceled.

And when it became clear that the March 15 proposal was so ill-advised that it would never be introduced by Clinch River supporters, and fearing that some form of parliamentary ploy would be used to push the bill through without the benefit of congressional scrutiny, I decided to introduce the DOE cost-sharing proposal myself. I made only one small change in it. I renamed it the Clinch River Breeder Reactor White Elephant Feeding and Financing Scheme of 1983.

I made it clear that I opposed my own bill and I urged my colleagues not to cosponsor it. And I am pleased to report that my bill has yet to receive the support of a single Member of Congress. Unfortunately, DOE feels obligated to give it one more try. So, in late June a supplement to the March proposal was put forward. That proposal, and I emphasize this to members of this committee, is simply a warmed-over version of the March proposal that received such a cool reception even from Clinch River supporters on the Hill.

It should be made absolutely clear that this most recent proposal is nothing more than an attempt to put a new face on the March proposal that completely failed to meet the cost-sharing requirements mandated in last December's continuing appropriations bill.

The proposal before your committee remains nothing more than an unlimited entitlement program for the utility industry with absolutely no effective cap. There is no new venture capital that the private utility industry must come up with; there is no new risk being assumed by the utility industry. The taxpayers retain the full risk for the success or failure of this project and the project remains totally open-ended with the Government and the taxpayers standing to pick up any additional cost overrun beyond the cost overruns that are already depicted on that chart.

To quote from the Department's own proposal, if net revenues available after paying for field and other expenses are insufficient to cover obligations to private investors in the project, the Federal Government will have to provide money for such purposes pursuant to the assurances it made to induce such investments.

The entire situation would be humorous were it not for what is at stake. First of all, in the words of David Stockman, the Nation is now facing $200 billion deficits as far as the eye can see. To countenance this kind of proposal that has no economic justification whatsoever is really unbelievable, that it could again be approached and brought before the Congress.

And, second, a careful analysis reveals that the Clinch River project is part of our Nation's energy problem—not part of its solution. Such special interest projects only serve to divert scarce capital resources away from the development of those energy technologies that could reduce our dependence upon petroleum in the most cost effective and environmentally sound manner possible.

In closing, I would like again to quote my friend and former colleague from Michigan, Mr. Stockman.

In September 1977, he wisely concluded, "The unwillingness of the electric utilities to absorb a larger share of the costs of commercializing the breeder is the most telling evidence to date of its lack of economic feasibility under present conditions."

There is simply no new justification for moving forward with this project, particularly with a cost-sharing plan that again provides the utilities with all of the benefits and the taxpayers all of the costs.

Thank you very much.

Mrs. **Lloyd**. Thank you very much, Mr. Wolpe.

Mr. Morrison, you may proceed with your testimony.

Mr. **Morrison**. Thank you, Madam Chairman.

I appreciate this opportunity to appear before this committee. I've commended this committee in the past because, as I look back at those years before I arrived in 1981, I see a number of wise investments—and I think Congressman Gore alluded to those—that we've looked at the nuclear fuel cycle and have invested in it as a nation, and I think it is not time to stop.

I'm going to paraphrase the testimony I had prepared, because a number of important points have been brought up this morning.

But let's not lose sight of the fundamental merits, the reason we got involved in the first place in this breeder program. We are talking about nearly inexhaustible electricity. This committee has worked through the years with three sources of essentially limitless energy. Fusion, which, as I watched the work, some of it going on in my district, is a ways out in the future. In fact, I believe quite a ways. The other source—direct conversion of applications of solar energy—coming along but certainly will not fill the needs for energy as this country gets going. And the breeder.

Of these three, only one, the fast breeder reactor, is currently within our technological grasp. It's there. Again, I commend this group and the leadership because, as early as 1970, before the first oil shock hit this Nation, you were investing money in this resource.

I guess I don't need to remind you that the uranium supply we already have mined and stored as tailings has the energy equivalent of 1.4 trillion barrels of petroleum. That's already out of the ground. We know that we have it. It represents four times the estimated oil reserves of the Middle East. It has a value of today's oil price of around $50 trillion. We own that. The public owns it. We've made that investment.

Of course, as I mentioned, Congress in 1970, based upon this vast energy resource, made the investment that started this program.

Now, 13 years later, from that first investment, after two oil shocks, gaslines at America's service stations, and skyrocketing utility bills, it is difficult to believe that we would back away from this investment that we've made in our Nation's security and economic health.

Clinch River is the flagship of this research and development program of developing the breeder technology. It's an important step toward commercialization. It is not commercialization as I see it, but a vital step between where we are now in research and the gradual move toward making it available for the actual generation of electricity.

I am pleased that the Clinch River project would follow in logical sequence behind the fast flux test facility, which you have supported through the years, and is located in my district. Let me mention that facility very briefly.

As of this morning, the fast flux test facility has completed 66 consecutive days of continuous power in its current run, which establishes a new record for sodium-cooled fast reactors. It's working very well.

One of the things that delights me as I visit that facility—and I have on numerous occasions—is to have the operators say, "Here's a change we're suggesting for Clinch River." In other words, it is serving as a technological cutting edge for modifications. I hope that's an argument against those who say the Clinch River is an obsolete technology. It is not. It is benefiting from the investment that you have supported through the years in research steps taken, moving in the direction of perfecting this nuclear fuel cycle through breeder reactors.

The FFTF, of course, is also regarded as the most advanced facility of its kind in the world, and represents a technological step no other nation has taken.

While this facility works and it's breaking records every day, it is on line, it is doing very well, it is not a breeder in and of itself. It's a smaller unit. It needs the next logical step, the extrapolation that 2½ times, up to the size of the Clinch River.

It's no secret that other advanced nations across the world, including France, Britain, West Germany and the Soviet Union, have aggressive breeder development programs. Madam Chairman, I remember when you had the leader of the French program here. I asked him about FFTF, and he said he wished he had such a laboratory in which to work to perfect the nuclear fuel cycle as we know it. We have it. I'm pleased. I noticed in the budget for FFTF, looking into the next couple of years ahead, that Japan will be investing up to $1 million per year in a cooperative effort with that.

So there is some effort to work together. And, yet, if we drop away from this program, if we eliminate our willingness to invest as a nation, that we lose this opportunity to cooperate with other countries in what obviously to them is a most logical step in energy development.

The fundamental argument that I've heard, in this last 2½ years that I have been here, against Clinch River is that the cost is too high. There's little doubt that the $4 billion project does represent a substantial financial commitment. But the total Federal cost to complete the project is roughly equivalent to 2 weeks of oil imports. And I think that's important. Certainly, the additional investment is worth 2 weeks of the oil we're currently purchasing from someone overseas.

We have a new alternative financing plan and, because of that, the near-term Federal outlays required to complete the plant have been reduced substantially. And I've been here this morning during your consideration, and won't repeat a number—the numbers. But 40 percent of the remaining costs, about $1 billion, originate from private-sector sources.

I would add also questions about the—whether the private commitment to this plant has kept up with the increased costs. I would maintain that if you deduct the cost of the delay, which has been estimated at a variety of figures, but I use a conservative one of about $1 billion cost increase due to the Government delay and the project is reduced to $3 billion, that the one-third private contribution in this financing plan of approximately $1 billion still retains this ratio of one-third to two-thirds, which is part of the original proposal, and that the benefits to those who invest are essentially the same as if they made other investments. There are no particular ripoffs involved, if that's what you are looking for, for those folks who would be willing to invest in this long-term commitment. That's what we asked the Secretary to come up with; he has done it.

Four Wall Street investment firms have endorsed the alternative financing procedure, and believe that it could be taken to the public with an appropriate response. So I think this financing plan strikes a prudent balance by providing for a reasonable sharing of the outstanding financial obligations associated with the Clinch River breeder reactor. It is an innovative partnership, and I think worthy of our support. It's what we asked for in the conference committee report, and we now have it in front of us.

There is a lot of support for this plan. You've heard about the unequivocal support of the administration, as repeated by Secretary Hodel this morning; also endorsed by a significant coalition of industry, labor, and engineering organizations, the U.S. Chamber of Commerce, the National Association of Manufacturers, Building and Construction Trades Department of the AFL-CIO, other labor unions representing boilermakers, electrical workers, pipefitters, and carpenters, the National Society of Professional Engineers, American Public Power Association, National Rural Electric Co-op Association, and even the National Association for the Advancement of Colored People. Add that to your list.

Very few issues these days are able to attract that sort of widespread support.

Ladies and gentlemen of the committee, we've come so far that it would be a shame not to complete the Clinch River breeder reactor. From its original inception, the project's merits were clearly apparent and defensible. Today, the justification for the project is even more apparent. This country will need additional supplies, domestically-produced electricity. We need to maintain the nuclear option. And the breeder promises a virtually inexhaustible source of energy. Even the Federal costs to complete the plant have been significantly reduced because of greater participation from private sources.

In the end, if we prevail and secure completion of this project, our future generations will be grateful that we exhibited the foresight to develop and commercialize and take the steps toward that commercialization of this very important technology.

[The prepared statement of Mr. Morrison follows:]

TESTIMONY OF CONGRESSMAN SID MORRISON
BEFORE THE
ENERGY RESEARCH AND PRODUCTION SUBCOMMITTEE
SEPTEMBER 15, 1983

Good morning, Madam Chairman and Members of the Subcommittee. I want to thank you for the opportunity to be here. As I have stated in the past, I compliment the Members of the Subcommittee on their wise investments through the years in developing and perfecting the nuclear fuel cycle and in a balanced energy approach for America's future.

I appreciate your invitation to testify on an issue all too familiar to this Subcommittee: the Clinch River Breeder Reactor Project. During my relatively short tenure in the House of Representatives, I have closely followed the legislative ups and downs of this project. Few budget items have attracted more comment or engendered more controversy than Clinch River. Tons of ink have already been spilled on detailing the pros and cons of the Clinch River Breeder Reactor and the new alternative financing plan.

My purpose this morning is not to spill any new ink or to shed any new light on CRBR. Rather my intention is to return to square one, to review the project and explain the overriding reasons why CRBR was first authorized and why it is vital that it be completed.

Sometimes as we get caught up in the elaborate debate and legislative nuances of a particular issue, we lose sight of the fundamental merits. In my view, this is what has happened to the Clinch River Breeder Reactor Project.

To me, the fundamental argument in support of Clinch River is that the breeder reactor technology offers our country a domestic supply of nearly inexhaustible electricity. All agree that there are three sources of essentially limitless energy: fusion, direct conversion applications of solar energy, and the breeder. Of these three, only one, the fast breeder reactor, is currently within our technological grasp.

The Congress recognized the enormous energy potential and the technological practicality of the breeder reactor when they first authorized the construction and operation of a LMFBR demonstration plant in 1970 (PL 91-273). The Congress then, even though operating under a pre-oil shock mentality, was convinced that our country would need new sources of electric energy. They were impressed with the virtually inexhaustible supply of domestic energy that breeders promise and committed our government to assist in the research and development of the technology.

Since the breeder converts an uneconomical fuel (Uranium-238) to a readily usable, economic nuclear fuel (Plutonium-239), the reactor greatly extends our domestic uranium reserves. In fact, the uranium already mined and stored as tailings from the government's enrichment plants could provide the energy equivalent of 1.4 trillion barrels of petroleum when used in breeder reactors. This represents approximately four times the estimated oil reserves of the Middle East. The U.S. supplies of this otherwise useless uranium stockpiled would be the equivalent of $50 trillion in oil imports. Based upon this vast energy potential, the Congress in 1970 was compelled to initiate efforts to develop the breeder technology to a commercial state. Thirteen years later, after two oil shocks, gas lines at America's service stations, and skyrocketing utility bills, it is difficult to believe that our country could consciously walk away from this investment in our nation's security and economic health.

Now, how does the Clinch River project fit within the objective of developing the vast potential of the breeder technology. CRBR is the flagship of our breeder reactor research and development program; it represents the next logical step in our nation's progressive effort to commercialize breeder technology. The Clinch River project will follow the successful completion of the Fast Flux Test Facility, a test breeder reactor located on the Hanford nuclear reservation in my congressional district.

The FFTF is a 400-megawatt (thermal), sodium-cooled test breeder reactor; it is designed to test fuels, materials, components, and conduct other high-performance breeder testing and evaluation in order to pave the way for future breeder development reactors. FFTF is an operating reactor and its success thus far proves that breeders do work. Since start-up in 1980, FFTF tests have successfully confirmed the breeder's inherent safety features and verified operating procedures and plant performance. As of this morning, the FFTF has completed 66 consecutive days of continuous power in its current run, which establishes the record for sodium-cooled fast reactors. I am very proud about the successful completion and initial operation of FFTF; it is regarded as the most advanced facility of its kind in the world and represents a technological step no other nation has taken. It is another indication of the international leadership role that the U.S. has played and of the tremendous investment we have already made in breeder reactor development.

This investment in the FFTF and other breeder support programs can not be cashed-in unless we continue to pursue construction of Clinch River. CRBR is the crowning cap, a critical objective of our entire breeder research and development program. The Clinch River Breeder Reactor will be a scale-up of 2½ times from the FFTF. Failure to complete the project would constitute an incredible waste of the resources already expended.

Besides being the cornerstone of a vigorous breeder reactor research, development and demonstration program, CRBR is also critical to retain nuclear fission as a viable long-term energy source. Our current crop of commercial reactors rely on relatively limited supplies of Uranium-235 fuel. The breeder reactor is the best of the currently existing means of extending our uranium reserves. In this sense, the breeder is an integral part of our nation's entire nuclear energy program and the development of fast breeders is essential to maintain the long-term viability of the nuclear option. The conclusion of a 1979 GAO report rings even more true today:

> The weight of evidence ... supports continuation of the Clinch River Breeder Reactor if this nation wishes to maintain a strong breeder reactor research and development program ... Breeders are the essential ingredient of making nuclear fission a long-term energy source. A decision not to develop breeders implies the phasing out of nuclear fission as an energy source (EMD-79-62, May 7, 1979, pp. v-vi).

Completion of Clinch River is also critical for our country to maintain our leadership role in the applications of nuclear technology. It is no secret that other advanced nations across the world, including France, Britain, Japan, West Germany, and the Soviet Union, have aggressive breeder reactor development programs that have in some respects outpaced our program. If we fail to complete CRBR, American dominance and leadership in the nuclear fuel cycle could well be surpassed. Strong U.S. leadership in the international nuclear community is critical to enable the United States to have a voice in international safeguard and non-proliferation efforts.

The fundamental argument against completion of Clinch River is that the cost is too high. There is little doubt that the $4 billion project does represent a substantial financial commitment. But the total federal cost to complete the project is roughly equivalent to two weeks of oil imports. Certainly, the costs associated with two weeks of oil imports represent a cost-effective investment aimed at enhancing our chances for energy independence.

Furthermore, because of a new alternative financing plan, the near-term federal outlays required to complete the plant have been reduced substantially. The financing plan ensures that 40 percent of the remaining costs, about $1 billion originate from private sector sources. This plan is an acceptable response to the concerns of the Conference Committee last year which asked the Energy Department to seek increased private participation in the project. Four Wall Street investment firms have also endorsed the alternative financing plan and believe that it satisfies this congressional directive.

In my view, the alternative financing plan strikes a prudent balance by providing for a reasonable sharing of the outstanding financial obligations associated with CRBR. The private investor obviously accepts a larger risk. The alternative financing plan is a resourceful effort to reduce the federal appropriations needed to complete CRBR while elevating the financial participation of the private sector. The cost sharing plan is an unprecedented and

and innovative partnership between the private and public sectors. I commend the leaders of government and industry for developing and agreeing to the specifics of this plan. It is a tribute to the importance of the project and reflects a good faith effort to respond to criticisms that CRBR entails an unacceptably large federal appropriation.

The alternative financing plan has attracted the support of a broad range of interests. Outside the unequivocal support of the Administration, the Clinch River Breeder Reactor and its alternative financing plan have been endorsed by a diverse coalition of industry, labor, and engineering organizations. For instance, CRBR is strongly supported by the U.S. Chamber of Commerce, the National Association of Manufacturers, the Building and Construction Trades Department of AFL-CIO, other labor unions representing boilermakers, electrical workers, pipefitters, and carpenters, the National Society of Professional Engineers, the American Public Power Association, the National Rural Electric Cooperative Association, and even the National Association of the Advancement of Colored People. Few legislative issues are able to capture the support of such a widespread and disparate spectum of interests. I think this is a reflection by industry, labor, and the scientific communities of the need to complete this vital project.

We have come so far that it would be a shame not to complete CRBR. From its original inception, the project's merits were clearly apparent and defensible. Today the justification for the project is even more apparent. This country will need additional supplies of domestically produced electricity; we need to maintain the nuclear option; and the breeder promises us a virtually inexhaustible source of energy. Even the federal costs to complete the plant have been significantly reduced because of greater participation from private sources.

In the end, if we prevail and secure completion of the Clinch River Breeder Reactor, our future generations will be grateful that we exhibited the foresight to develop and commercialize this technology.

Mrs. LLOYD. Thank you very much, Representative Morrison.

At this time, we're going—I thought—at this time, we would like for Senator Humphrey to join the panel. We will hear from you, Senator Humphrey and then, without objection, we will proceed and question three gentlemen as a panel.

Welcome again, Senator Humphrey. Please proceed with your testimony.

STATEMENT OF GORDON HUMPHREY, A SENATOR IN THE U.S. SENATE FROM THE STATE OF NEW HAMPSHIRE

Senator HUMPHREY. Thank you, Madam Chairman and my colleages in the House.

I realize that time is of the essence, so right off the bat, I'm going to ask that my full remarks be placed in the record, and I will simply——

Mrs. LLOYD. Without objection, your full remarks will be in the record. And please proceed.

Senator HUMPHREY. And simply touch upon some of the essential points.

But first, as a very quick reference, I'd like to point out that, despite all of the testimony and the implications, or the implied statements, that the Clinch River breeder reactor demonstration project is not essential to our base breeder reactor research program. If Clinch River disappears from the face of the Earth today or tomorrow, it does not affect our base breeder reactor research program which, in dollar terms, comprises the bulk of what we're doing. Clinch is actually a small part.

In fact, as has been noted earlier, Secretary Hodel himself has, in several interviews—two interviews, at least that I know of—said as much. And in an interview with the Washington Times, the transcript of which I would ask—part of the transcript, that is the part dealing with Clinch River, I would ask be made part of the record.

Secretary Hodel says as follows: "What is right with Clinch River is that the United States needs, in my view, to retain a position in the breeder program. What is wrong with Clinch River is that you don't necessarily have to have Clinch in order to do that." And then further in the interview, he says, "Breeder R&D, I think, is essential if we are going to maintain any position. Not Clinch, but breeder R&D is essential if we are going to maintain any position at the nonproliferation table."

Then again, very quickly, from an interview in Nucleonics Week—and again I would ask that this be made a part of the record.

Mrs. LLOYD. Without objection.

[The information follows:]

[From the Nucleonics Week, June 30, 1983]

HODEL SEES R&D, NOT A MACHINE DOMINATING U.S. BREEDER SCENE IF CRBR DIES

DOE will continue a base breeder program whether or not the Clinch River Breeder Reactor project is funded by Congress, but "we may not want a demonstration program." Energy Secretary Donald Hodel said in a interview last week. Among other things, the program keeps the U.S. active in the international nonproliferation arena and helps it retain the option to build a breeder in the future. Hodel said, He cautioned that his comments shouldn't be read as an indication that he thinks CRBR won't be re-funded, because the final report on cost sharing must still be considered. Nor would failure to fund the project mean that the $270-million DOE requests for CRBR in fiscal year 1984 would necessarily be turned toward other nuclear, or even energy, programs. Hodel told Nucleonics Week.

"The research work that needs to be done we still need to continue." Hodel said when asked about the fate of the base breeder program. "And in so doing, we continue to be participants in the international activities and we have proliferation benefits as well as the opportunity to keep the technology moving in such a way that when the United States decides it wants to go for a breeder, we've got a foundation laid that permits us not only to have the technical and the professional ability, but also presumably the ability to build a licensable project."

The U.S. remains on the "cutting edge of technology" in some aspects of the breeder, he said, and should remain there because it gives the U.S. something to offer in return for concessions and agreements concerning proliferation. Without the base breeder program, "we have losts our seat at the table with the rest of the world, which is proceeding with breeders. . . If we back out of the program, forget it. I just can't see us doing that, at a very political level," Hodel continued.

Senator HUMPHREY. Quoting Secretary Hodel, "We may not want a demonstration program."

I'd also like to make the point on that same score that in a letter to Senator Heinz and I—and me—the president of the Rand Corp., which corporation we requested, make a study of the need, the essentiality of Clinch River to our total breeder reactor research program, that Donald Rice, the president, emphasized that it is not, in his opinion, essential to the breeder reactor research program.

I would ask that the letter from Mr. Rice, the president of the Rand Corp., be made part of the record also.

Mrs. LLOYD. Without objection, it will be made a part of the record, as well as that tie-in with the letter from Dr. Alvin Weinberg.

[The information follows:]

[From the Congressional Record, Vol. 129, No. 92, June 28, 1983]

CLINCH RIVER—THE RAND REPORT IS IN

Mr. HUMPHREY. Mr. President, by withholding funds until industry contributes more, the Senate last week took a major step toward resolving the controversy surrounding the Clinch River breeder reactor project. I think that as soon as industry's plan is presented and hearings are held, the difficulty of such schemes vis-a-vis the State public utility commissions will become clear. Givern industry's lack of venture capital and utilities' difficulties in completing construction work in progress, the last thing State utility commissions are going to want their utilities to do is invest more money into distant demonstration efforts such as Clinch River. Certainly, it would be embarrassing if Congress approved alternative financing only to find 2 years later than the public utilities commissions are unwilling to allow any industry funds to move.

There are, however, more substantial reasons for Congress to refuse to participate in alternative financing for the project. In specific, demonstrating commercial-sized breeders now. Is both economically and technically premature.

I have argued this before, but it is frequently brushed aside. It ought not to be. Indeed, recently Senator **Heinz** and I asked the Rand Corp. to evaluate the merits of proceeding with the project. We did this becuase so many claims have been made by both sides and because the Rand Corp. was the one consultant firm both sides saw fit to cite.

The Rand Corp.'s reply, authored by its president, Dr. Donald Rice, was blunt and to the point. Arguments about how technically advanced the project is are largely irrelevant and ultimately leads down blind policy alleys. Nor should the debate focus on how the project's design compares to that of its foreign competitors. "This issue," Dr. Rice notes, "should not be permitted to distract attention from more serious matters that bear directly on whether to continue the project."

Again, the key question with regard to Clinch River is whether or not it is the "best path to meeting long-term national energy goals and a sound strategy for insuring that nuclear energy supply options are available." The Rand Corp.'s answer here is no and the reason why is simple: Before the project might make sense, five conditions would need to be met and none are yet present.

The first condition is that there be high growth in electricity demand for the next 20 years, as high as estimates made in the early 1970's. The second is that there be a large and growing fleet of light water reactors. When Clinch River was first conceived the assumption was that there would be nearly 1,200 reactors on line by 2000, not 150. The third is substantially higher uranium prices than those now current or projected through the year 2020. The fourth is the availability of inexpensive light water reactor fuel reprocessing plants, none of which now exist. And finally the absence of better breeder alternatives, which now even Secretary Hodel has expressed doubt about.

Mr. President, I think it is important that Congress understand that what justified Federal support for the Clinch River breeder reactor back in the early 1970's no longer makes sense. I ask that the Rand Corp.'s evaluation of the project's merits, the original request that Senator Heinz and I made, and the joint "dear colleague" we sent out last Friday concerning the report be printed in the **Record**.

The material follows:

RAND,
Santa Monica, Calif., June 9, 1983.

Hon. JOHN HEINZ,
U.S. Senate,
Washington, D.C.

DEAR SENATOR HEINZ: Your letter of 13 May asked that we assess the adequacy and sophistication of the technology demonstrated in the Clinch River Breeder Reactor Project and estimate its importance to a national breeder reactor program. The discussion that follows reflects the views of several of our experienced staff on these issues. As you will see, we believe that the first issue is not the right question. The sophistication of the technology embodied in the Clinch River Breeder Reactor (CRBR) is discussed below. But it cannot settle the question of whether the CRBR project should be continued. Instead, the fundamental issue is whether the present CRBR project and LMFBR program are essential to and consistent with national energy requirements. I will first discuss why we feel that technological sophistication should not be the focus of Congressional concern, then suggest criteria for assessing the project's national importance and reaching a judgment on whether it should be continued.

TECHNOLOGY OF THE CRBR

Disagreements about the CRBR technical design have two dimensions. First several of the design features that Westinghouse mentions are more advanced than comparable features of the five principal breeder reactor design favored elsewhere in the world. But it is also true that the general conceptual design of the CRBR stems from the late 1960s, although detailed design began only to 1974. Of course, the foreign designs all date from the same era.

Second, it is not the case that newer design features are necessarily better than older concepts. Incorporating such features entails a tradeoff between potential improvements and risks. For example, Westinghouse emphasizes that the upper intervals of the reactor vessels are Inconel clad, which substantially improves their life expectancy. The 1979 White House Paper argues that this innovation is a liability, pointing out that because the selected alloy cannot be welded with present technology, the system must incorporate mechanical fasteners that cost more and complicate the design. Both observations are basically correct and reflect the best technical judgments of different experts. Only time will tell whether higher cost and complexity outweigh longer component life, or vice versa.

The CRBR could undoubtedly be made to appear more attractive (less costly, more productive, safer, etc.) by incorporating different design features. But this is true of any new technology. At some point, any new project must freeze the key design features. Moreover, experience with nuclear installations in the U.S. and elsewhere suggests that the theoretical promise of new design features is often not fulfilled.

For these reasons, we believe that the Congress should not concern itself with how the CRBR design compares to that of its foreign competitors. In fact, this issue should not be permitted to distract attention from more serious matters that bear directly on whether to continue the project.

CRITERIA FOR ASSESSING NATIONAL IMPORTANCE

As suggested above, the fundamental issue is whether the CRBR project, and the program of which it is a part, constitute the best path to meeting long-term national energy goals and a sound strategy for ensuring that nuclear energy supply options are available as needed. Another way of stating the issue is to ask how the United States can best invest its R&D resources so as to ensure an adequate electricity supply in the next century. Only if we could reasonable expect the costs of electricity from the combination of LWRs and LMFBRs to be less than the cost of alternative systems of supply—nuclear or non-nuclear—does the CRBR project make sense. A number of conditions must be met if that lower cost of electricity criterion is to be achievable.[1]

High growth in electricity demand the next two decades.

A large and growing number of light water reactors in operation during the '80s and '90s.

Uranium prices were forecast to be much higher than current prices.

Cost effective reprocessing capability for both LWRs and LMFBRs, and

The absence of better breeding alternatives.

At this time, neither we nor most observers believe that any of these conditions hold. I will discuss each in turn.

(1) Projections of national energy requirements have changed radically since the early 1970s. The Department of Energy (DoE) recently released data indicating that per capita consumption of energy fell last year to its lowest level since 1967. The DoE currently estimates that electricity consumption will grow at less than four percent a year for the remainder of this decade. That is roughly half the growth rate predicted by ERDA when the CRBR design was stabilized in 1974. These estimates reflected the classical (and erroneous) assumption that total energy demand was solidly coupled to GNP growth, independent of the relative price of energy. But the amount of energy needed to produce a specified increment of GNP growth has fallen appreciably since 1974, and by 1990 it promises to decrease by another 20 to 30 percent. As early as 1975 I reported to the head of ERDA that the electricity demand assumptions used in economic justifications of the CRBR project appeared to be much too high and suggested halving the estimates. Experience of the past eight years has indicated that my estimate still overstated growth in demand.

(2) If earlier demand projections had been correct, it is at least possible that the number of LWRs in the United States would have continued to grow at a rapid rate. In fact, however, the LWR industry has taken a profound and lasting downturn beginning in 1974—the last year in which a nuclear power plant was ordered in the United States. Since then, scores of reactor projects have been canceled, including some under construction. This downturn stems not only from the decrease in elec-

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[1] The full set of conditions is presented and the relationships between them modeled in K. A. Solomon, "Valuation of Nuclear Reactor Spent Fuel: Method, Application, Analysis." The Rand Corporation. R-2239-DOE, February 1978.

tricity demand but also from the relentless increase in LWR capital costs.[2] Thus the LWR population is not expanding. Without a large and expanding population of light water reactors, a breeder to produce fuel for LWRs loses its justification.

(3) The basic premise of the LMFBR program is the assumption that nuclear fuel will be needed for a large number of electricity-generating reactors in the early years of the next century. However, although estimates vary, the expectations of the early 1970s that economically accessible uranium sources would be largely exhausted by the 1990s have proved unfounded. If sufficient uranium to support the nuclear plant inventory of the early 21st century can be obtained more cheaply than the plutonium generated CRBR-type plants, there is no economic justification for continuing the present line of LMFBR development. An alternative technical approach that provided a higher assurance of sound economic return could be attractive.

(4) It is also necessary to acknowledge explicitly that a commitment to breeder reactors is also a commitment to reprocessing for both light water reactors and for breeders. Developing that essential reprocessing capability may be as difficult as developing the breeder reactor itself. The associated waste disposal, fuel transport, nuclear safety, accountability, and security issues all require demonstrated solutions, currently lacking.

Because economical LWR reprocessing is essential to breeder economics, it is reasonable to argue that a native reprocessing capability for nuclear fuel should have a higher priority than a breeder reactor. Such reprocessing can substantially extend the availability of fissile fuel, even without breeder development. Thus demonstrating the existence of acceptable solutions to reprocessing problems is at least as important as acquiring a functional breeder demonstration plant.

(5) Even if the first four conditions could somehow be met, it is still not clear that an LMFBR is the most promising nuclear power generation technology. Rand and other institutions have suggested several alternatives to the LMFBR. One is the accelerator breeder concept that would result in breeding plutonium from a uranium fuel cycle, or fissile uranium from a thorium-based fuel cycle. For the longer term, an even more promising breeder concept may be the hybrid fusion system, which like the accelerator breeder could breed reactor fuel while not coupled to a power producing reactor. The uncoupled breeders also lend themselves to the support of improved fission power reactor systems of several types[3]. "Improved" fission reactors have, among other improvements, higher conversion ratios than current LWRs.

Since none of the five conditions has been met, we feel that the current strategy for breeder development cannot be justified on economic grounds and is also extremely problematic on grounds of energy security or "keeping options open."

As I mentioned briefly above, almost eight years ago the director of ERDA, concerned about the validity of the CRBR project, asked me to review its status and prospects. In response, I urged a cautious, sequential approach that, in time, could demonstrate whether the technology was appropriate, the need sufficient, and the potential cost reasonable. (see enclosed Paper). Time has passed, and the probable cost has grown, the national need for the project still remains to be confirmed, and the technology remains controversial. In addition, it seems apparent that the currently proposed schedule for the CRBR and follow-on LMFBR facilities is insufficiently consistent with the potential availability of reprocessing facilities. In view of the lessened apparent urgency of the CRBR project and its clearly diminished role in the national energy program. I would again urge that the nation explore its technical options and possibilities, and that we eschew committing ourselves to the CRBR and the strategy that it embodies.

I would recommend that the Department of Energy be asked to develop an alternative, lower cost R&D program that emphasizes step-by-step sequential development of several technical approaches, pointing toward a much later deployment time than that currently envisioned for the LMFBR.

Sincerely yours,

DONALD B. RICE, *President.*

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[2] See William E. Mooz, "Cost Analysis of Light Water Reactor Power Plants," The Rand Corporation, R-2304-DOE, June 1978; and, "A Second Cost Analysis of Light Water Reactor Power Plants," R-2504-RC, December 1979.

[3] See B. W. Augenstein et al., "An Examination of Alternative Nuclear Breeding Methods." The Rand Corporation, R-2267-DOE, July 1978.

U.S. **Senate,**
Washington, D.C., May 13, 1983.

Dr. **Donald Rice,**
President, the Rand Corp.,
Santa Monica, Calif.

Dear Dr. Rice: During the last two years there has been considerable congressional debate over continued federal support for the Clinch River Breeder Reactor Project. One of the key issues in this controversy has been whether or not the project's design is obsolete. Those who are opposed to the project argue that the reactor's design is obsolete and that the project is not necessary to our breeder research and development program. Those who favor the project argue that it is the most advanced reactor design in the world and that the project is essential to our breeder reactor research and development efforts.

It is important that we have the best information possible on this question. We believe that the RAND Corporation can be of help. Your corporation has done extensive work for the Department of Energy and the Nuclear Regulatory Commission concerning the nuclear fuel cycle, nuclear safety, and licensing and safety issues associated with the liquid metal fast breeder reactor. Several of these studies—"Some implications of the Three Mile Island Accident on LMFBR Safety and Licensing: The Design Basis Issue," "A Review of Cost Estimation in New Technologies," "Anticipated Transients Without SCRAM for Light Water Reactors: Implications for Liquid Metal Fast Breeder Reactors"—have been cited by both sides of the Clinch River debate. Given the fair and thorough work your corporation has done in these areas and the widespread respect its work is accorded, we hope your staff would comment on the enclosed materials.

The first set of materials—a white paper prepared for the Congress May 11, 1979 by the White House—argues that the Clinch River Breeder Reactor's design is obsolete. These materials also argue that the project is not essential to the U.S. having a sound breeder reactor research and development program.

The second set of materials—Department of Energy documentation along with materials presented by the Westinghouse Electric Corporation—argues that the Clinch River Breeder Reactor has the most advanced breeder design in the world and that the project is essential to our long-term breeder reactor research and development effort.

We are at a loss to evaluate these materials by ourselves—although we know that they could not all be correct—and would appreciate it if your staff would critique both sets of material. If this analysis could help us answer the questions of how advanced the project's design is and how essential the project is to our long-term breeder reactor research and development program, it would be of tremendous public service.

With warmest regards, we are

Sincerely,

Gordon J. Humphrey.
John Heinz.

U.S. **Senate.**
Washington, D.C., June 24, 1983.

Dear Colleague: During the last two years, there has been considerable Congressional debate over continued federal support for the Clinch River Breeder Reactor Project. Controversy has centered not only on the project's design but also on the basic question of the need for a breeder demonstration project at this time, considering the nation's real energy needs and rising budget deficits.

In an effort to answer several of the questions which have been asked about Clinch River, we recently asked the Rand corporation to provide an independent assessment of the Clinch River Project. The findings of the Rand study (which is enclosed for your review) lead us to conclude that it would be difficult to justify continued federal funding for the Clinch River in the absence of a viable industry cost sharing plan.

The fiscal year 1984 Energy and Water Appropriations bill provides no funds for the Clinch River Breeder Reactor. The Senate report accompanying the legislation States, "Until an alternative financing arrangement is enacted no funds should be obligated or expended for additional major equipment orders or construction on any permanent structures or facilities." We believe this is good policy. Although it is necessary to maintain a balanced national energy program including important research and development activities for breeder reactor technologies, we believe industry must bear the burden of co-financing expensive demonstration projects.

We hope that the Rand study is informative and useful to you. If you have any further questions, please contact Henry Sokolski of Senator Humphrey's staff at x48766 or George Tenet of Senator Heinz's staff.

Sincerely,

GORDON J. HUMPHREY.
JOHN HEINZ.

Oak Ridge Associated Universities
(615) 576-3171
Post Office Box 117
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September 7, 1983

SEP [illegible]

The Honorable Marilyn Lloyd
U.S. House of Representatives
2334 Rayburn Building
Independence and South Capitol Street, S.W.
Washington, D.C. 20515

Dear Congresswoman Lloyd:

This letter is prompted by the recent analysis from the Rand Corporation to Senators Heinz and Humphrey arguing for abandonment of the Clinch River Breeder. The conclusions of the Rand Corporation are based on low projections of electric demand, high availability of large amounts of uranium, and low penetration of nuclear power--all during the next two or three decades.

I cannot deny the plausibility of each of these assumptions. I believe, however, they miss the essential justification for pursuit of breeders in general, and completion of CRBR in particular. The breeder is an inexhaustible energy source, in the same sense as solar energy or fusion. Justification for its pursuit, just as for the pursuit of solar energy or fusion, must be sought in the broadest, and longest term, national goals. What is at stake is nothing less than an energy system that can serve for centuries, if not millenia. Thus the short term considerations such as are raised in the Rand paper, even if plausible, are hardly central. At the very least, exactly the same arguments, and with greater force, can be leveled against our Nation's pursuit of fusion and solar energy--each of which receive about $600 million per year, the same amount we now spend on the breeder. (For fusion, these are direct expenditures; for solar, they are in the form of tax rebates.)

Every administration since President Eisenhower's has reconfirmed the achievement of inexhaustible energy sources as a prime national technological goal--not unlike our commitment to space exploration. This has been our basic strategic decision; there seems to be agreement that this strategic decision has been and remains valid.

The argument then comes down to tactics: how best to achieve a successful inexhaustible energy source based on fission of uranium. The Rand paper argues that CRBR should be scrapped in favor of "an alternative, lower cost R&D

program." All of my 42 years of experience in heavy reactor development points to the futility of an R&D program that has no well-defined goal. Where very heavy, slow-moving technologies like nuclear energy are concerned, we learn far more, and far more efficiently, from full-scale, real reactors than we do from incremental testing that has no clear focus in an integrated device. Thus as a tactical matter, building and operating CRBR, rather than the course advocated by Rand, seems to me to be the more efficient way to achieve the strategic goal of an ultimately economic breeder.

There is a second powerful argument for completing CRBR, an argument that has unfortunately been ignored in the debate. Breeder reactors (as well as most of the other inexhaustibles) are high capital cost, low operating cost devices. In this respect they resemble dams (which utilize a form of solar energy). Conventional accounting practices for estimating costs of power are derived mostly from experience with relatively short-lived fossil-fueled plants which have high, not low, operating costs. Thus our economic horizon in judging costs is about 30 years. Yet dams last very much longer than thirty years. That reactors share this attribute with dams is attested by the 27-year-old Calder Hall non-breeder reactors in England, which are expected to operate for many more decades. They are now, and will continue to be, producing England's cheapest electricity.

The only way we can tell whether breeders will last, say, 75 or 100 years, rather than 30 years, is to build some breeders now, and operate them for a very long time. Building and operating CRBR is crucially important in determining the longevity of breeders. Should CRBR still be running well 30 years from now--which I consider entirely probable--it will be producing electricity at about one-half the cost of electricity from competing fossil-fueled plants. I should think that once this possibility of extreme longevity is realized, the economic pressure to convert to nuclear power will become very great. But we shall not be able to make this judgment unless we have experience--tedious, lengthy, and expensive--with breeder reactors.

Just 30 miles from where I live is Norris Dam, built about 50 years ago. I enjoy extremely cheap electricity from Norris Dam, and I am grateful to our predecessors who sacrificed a good deal to build Norris Dam. I believe it not unlikely that our grandchildren will be saying the same thing about the Clinch River Breeder--but only if we have the courage to finish it now.

Sincerely,

Alvin M. Weinberg

Alvin M. Weinberg
Director
Institute for Energy Analysis

AMW:bc

Senator HUMPHREY. If there's one thing that characterizes the history of this project, it's uncertainty. I'm going to ask my assistant, Dr. Henry Sokolski, to display two charts that are constructed on the basis of research done at my request by the Congressional Research Service. And the text of this report is available at the press table.

[Chart shown.]

Senator HUMPHREY. The first one shows that, no matter how much you spend—we've spent from year to year—and how much time has passed, the—the cost remaining, the expenditures remaining in constant 1983 dollars have always been the same. That flat—nearly flat—red line on the top, the first estimate—there have been five official estimates of the costs remaining to complete Clinch. And expressed in constant 1983 dollars, everytime we've gotten a new estimate, we've been the same distance in constant dollars from completing the project. The cost itself is the green line which you see rising.

This is not the kind of chart that gives this Member of Congress at least any sense of security about obligating the taxpayers of the United States to assume a greater burden and a much longer-term burden than they are now faced with. We're talking about a 30-year obligation to operate this plant if we go forward with this alternative financing plan.

[Chart shown.]

Senator HUMPHREY. The bottom chart is temporal. It shows that whenever the official estimates have been made with respect to how much longer we need to complete the plant, it's always been about 7 years. And this—this—this performance in history, again, gives us pause and gives us justification to worry about future cost overruns, future delays, all of which must be taken into consideration when we consider—when we entertain the thought of obligating again the taxpayers of the United States with respect to guaranteed bonds and all kinds of operating obligations.

Let me just finally compare the new program—the new plan, that is—the new proposal with the old. Under the old plan, the Federal Government was obligated for 5 years to operate Clinch River, the breeder reactor. Under the new proposal, we'll be obligated to operate it for 30 years. This is no small change in responsibility.

Under the present proposal, the Federal Government would own the plant and own its—own the revenues from its electrical output. Under the alternative, the new plan, we have to surrender the ownership of the plant and surrender ownership of the revenues.

Under the present scheme, Congress has annual oversight through the annual appropriations process. Under the new plan, which is one multiyear chunk, Congress will have no real practical future oversight capability.

Under the old plan, the cost is *x*, take your pick. There's one for every party in the controversy, I suppose. Under the new plan, the cost is *x* plus about $150 million, because the borrowing will be more expensive than if it were straightforward Treasury borrowing, because this will be tied to one specific controversial problematical project, Clinch River, and the questions about its output.

My best estimates are that the additional costs of this unique kind of borrowing versus straightforward Treasury borrowing will be an additional $150 million in costs on this project.

Under the present scheme, financing is on budget, where it should be responsibly. Under the proposal before us, the financing will be off-budget at a time when we should be avoiding that at all costs, like the plague, it seems to me. It's not a responsible straightforward way of doing business.

And in summary, I would observe that the new plan is not cost sharing at all. It doesn't increase the risk of the utilities. They are not increasing their financial participation; simply making good on the original agreement and paying interest on what they've owed in deferred payments. It's not a cost-sharing program. It's a—and it's not a cost-reduction program. It's a—I don't know quite what to call it. It's certainly a back-door scheme to accomplishing something that the Congress has refused to do.

I thank the Chair and its members of the committee for having me here today, and I'd be happy to participate with the other members of the panel in addressing questions.

[The prepared statement of Senator Humphrey follows:]

STATEMENT OF HON. GORDON J. HUMPHREY,

U.S. SENATOR FROM THE STATE OF NEW HAMPSHIRE

BEFORE

THE U.S. HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION

SEPTEMBER 15, 1983

WASHINGTON, D.C.

I WANT TO THANK THE CHAIRWOMAN FOR INVITING ME HERE TODAY TO TESTIFY AND EXPLAIN MY OPPOSITION TO THE LATEST CLINCH RIVER BREEDER REACTOR FINANCING PLAN. AS I THINK EVERYONE HERE ON THE COMMITTEE KNOWS, I HAVE OPPOSED FEDERAL SUPPORT OF THE CLINCH RIVER DEMONSTRATION PROJECT FOR SEVERAL YEARS NOW.

AS THE CONTROVERSY SURROUNDING THIS PROJECT HAS INCREASED, SO TOO HAVE THE NUMBER OF ARGUMENTS AND ASPECTS OF THE PROJECT THAT HAVE COME UNDER DISPUTE. IN THE LAST YEAR ALONE THERE HAVE BEEN ARGUMENTS OVER THE COST OVERRUNS AND TEST FAILURES OF THE PROJECT'S STEAM GENERATORS, LITIGATION OVER THE PROJECT'S SITING AND LICENSING, SERIOUS QUESTIONS RAISED ABOUT THE SOURCE AND PRICE OF THE PROJECT'S PLUTONIUM FUEL, AND DISPUTES OVER WHETHER OR NOT THE 13-YEAR OLD PROJECT IS STILL TECHNOLOGICALLY UP TO DATE.

THERE ALSO HAVE BEEN ARGUMENTS OVER WHETHER OR NOT THE STATE PUBLIC UTILITY COMMISSIONS WILL ALLOW THEIR UTILITIES TO PARTICIPATE IN ANY NEW TYPE OF AID TO THE PROJECT (ALTERNATIVE FINANCING OR OTHERWISE), WHETHER OR NOT THERE IS ANY WILLING BUYER FOR CLINCH RIVER'S ELECTRICITY, EXACTLY HOW MUCH MORE THE PROPOSED ALTERNATIVE FINANCING PLAN WILL ADD TO THE PROJECT'S COST, WHETHER OR NOT THE DEPARTMENT OF ENERGY (DOE) HAS EVADED CONGRESSIONAL AND GENERAL ACCOUNTING OFFICE REQUESTS FOR DATA ON COST AND COMPLETION DATE ESTIMATES, AND WHETHER OR NOT FEDERAL SUPPORT OF WHAT THE DEPARTMENT OF ENERGY (DOE) ITSELF LABELS IN

ITS BUDGET JUSTIFICATION AS AN "INDUSTRIALIZATION PROJECT" SHOULD BE FINANCED THROUGH THE SALE OF OFF-BUDGET GOVERNMENT-GUARANTEED BONDS GIVEN CONGRESSIONAL AND ADMINISTRATION DESIRES TO LIMIT SUCH FINANCING DEVICES.

WITH ALL THESE ARGUMENTS BEING MADE AND DISPUTED, THE DEBATE OVER THE PROJECT HAS BECOME UNNECESSARILY COMPLEX. IN FACT, I BELIEVE THERE ARE ONLY FIVE BASIC POINTS THAT WE NEED TO FOCUS ON WHEN CONSIDERING CLINCH RIVER AND DOE'S GOVERNMENT GUARANTEED FINANCING PROPOSAL.

* 1. THE FIRST IS THAT DESPITE THE DESIRE OF CERTAIN NUCLEAR VENDORS AND UTILTIES TO BUILD THE PROJECT, CLINCH RIVER ITSELF IS NOT NEEDED TO KEEP THE U.S. AHEAD IN BREEDER RESEARCH AND DEVELOPMENT. IN FACT, THE NONESSENTIAL CHARACTER OF THIS PROJECT WAS FIRST POINTED OUT BY THE ENERGY DEPARTMENT'S OWN BLUE-RIBBON ENERGY RESEARCH ADVISORY BOARD IN LATE 1981. IN ITS REPORT TO SECRETARY EDWARDS, THE BOARD RECOMMENDED THAT THE EXISTING BASE BREEDER RESEARCH AND DEVELOPMENT PROGRAM (NOW BUDGETED AT MORE THAN $300 MILLION) SHOULD BE MAINTAINED BUT THAT THE CLINCH RIVER BREEDER REACTOR PROJECT, A DEMONSTRATION EFFORT, NO LONGER WAS AN URGENT PRIORITY AND SHOULD BE DEFERRED. THE RAND CORPORATION'S PRESIDENT, DONALD RICE, RECENTLY EMPHASIZED THE SAME POINT IN A REPORT TO SENATOR HEINZ. MORE IMPORTANT, THE SECRETARY OF ENERGY HIMSELF HAS EXPLICITLY STATED (SEE INTERVIEW, NUCLEONICS WEEK, JUNE 30, 1983 AND THE LOS ANGELES TIMES, JUNE 27, 1983) THAT THE CLINCH RIVER BREEDER REACTOR IS NOT NECESSARY TO KEEP US AHEAD IN BREEDER RESEARCH AND DEVELOPMENT, THAT MAINTAINING THE BASE

BREEDER PROGRAM IS WHAT IS CRUCIAL. THUS, IN SPEAKING ABOUT THE CONSTRUCTION OF CLINCH RIVER WE ARE IN FACT TALKING ABOUT A LUXURY. GIVEN CURRENT FISCAL CONSTRAINTS, IT IS NOT SOMETHING THAT WE OUGHT TO SELL OUR SOUL FOR.

* 2. FOR ANYONE WILLING TO LOOK, THE PROGRAM'S HISTORY CLEARLY WARNS AGAINST THE IMPRUDENCE OF TRYING TO FUND IT WITH GUARANTEED REVENUE BONDS, THE ISSUANCE OF WHICH PRESUMES THE PLANT CAN BE BROUGHT ON LINE AT A PARTICULAR DATE AT A PARTICULAR COST. IN FACT, USING DOE'S OWN OFFICIAL ESTIMATES AND THOSE OF THE ATOMIC ENERGY COMMISSION AND THE ENERGY RESEARCH AND DEVELOPMENT AGENCY THAT PRECEEDED IT, THE CLINCH RIVER BREEDER REACTOR HAS ALWAYS BEEN AT LEAST 7 YEARS AND $2.1 BILLION (IN CONSTANT 1983 DOLLARS) AWAY FROM COMPLETION (SEE ATTACHED CONGRESSIONAL RESEARCH SERVICE STUDY). THIS HAS BEEN THE CASE EVERY YEAR SINCE 1974 WHEN THE FIRST "FIRM" OFFICIAL COMPLETION COST ESTIMATES ON THE PROJECT WERE MADE. THIS WAS THE CASE THREE YEARS BEFORE THERE WAS ANY EXECUTIVE SLOWDOWN ON THE PROJECT. AND THIS IS THE CASE EVEN NOW AFTER $1.5 BILLION (IN YEAR OF EXPENDITURE DOLLARS) HAS BEEN SPENT ON THE PROJECT, AND 70 PERCENT OF THE PROJECT'S COMPONENTS HAVE BEEN ACQUIRED. JUST THIS MORNING THE WASHINGTON POST NOTED THAT THE LATEST ESTIMATE ON WHICH DOE BASED ITS PROPOSED FINANCING PLAN HAS BEEN CHALLENGED BY DOE'S OWN INDEPENDENT COST ESTIMATING GROUP AS BEING $300 MILLION TOO LOW AND ONE AND A HALF YEARS TOO OPTIMISTIC ABOUT THE PROJECTED COMPLETION DATE. IN SHORT, DOE KEEPS TELLING US HOW THEY ARE ALMOST DONE BUT THEY KEEP ASKING FOR MORE AND MORE MONEY AND TIME TO COMPLETE THE

PROJECT. NOW DOE COMES FORWARD WITH A PLAN THAT WOULD HAVE THE GOVERNMENT PLACE ITS FAITH IN A SET OF ESTIMATES THAT ARE ALREADY OBSOLETE. SUCH A PROJECT IS HARDLY A GOOD BET FOR REVENUE BOND FINANCING (WHICH ASSUMES KNOWN PROJECT COSTS AND FIRM REVENUE STREAMS), AND IS EVEN A WORSE PROSPECT FOR GUARANTEED REVENUE BOND FINANCING.

* 3. DOE AND THE BREEDER REACTOR CORPORATION IGNORED CONGRESSIONAL INSTRUCTIONS TO INCREASE THE PRIVATE SECTOR'S SHARE OF THE PROJECT'S COST AND INSTEAD ARRIVED AT A PLAN THAT IRONICALLY INCREASES THE PROJECT'S FINAL COST. AS I HAVE NOTED REPEATEDLY IN THE CONGRESSIONAL RECORD, CONGRESS' ORIGINAL INSTRUCTIONS TO DOE WERE TO "VIGOROUSLY EXPLORE PROPOSALS, INCLUDING A RECONSIDERATION OF THE ORIGINAL COST-SHARING ARRANGEMENT THAT WOULD REDUCE FEDERAL BUDGET REQUIREMENTS FOR THE CLINCH RIVER PROJECT." THESE INSTRUCTIONS SIMPLY WERE IGNORED. IN FACT, BOTH DOE AND THE BREEDER REACTOR CORPORATION, WHEN THEY CITE THESE INSTRUCTIONS, DROP THE PHRASE "INCLUDING RECONSIDERATION OF THE ORIGINAL COST-SHARING ARRANGEMENT" AND INSERT AN ELIPSIS THERE. THE REASON WHY THEY IGNORED THESE INSTRUCTIONS IS IMPORTANT--THE ORIGINAL COST SHARING PLAN ACTUALLY REQUIRED THE UTILTIES TO PUT UP MONEY OF THEIR OWN AMOUNTING TO NEARLY 40 PERCENT OF WHAT THE PROJECT THEN WAS ESTIMATED TO COST AND ONLY OFFERED THEM ACCESS TO THE PLANT FOR LEARNING ABOUT BREEDERS IN RETURN. THE CURRENT PLAN, IN SHARP CONTRAST, INVOLVES NO ADDITIONAL UTILITY COST SHARING. INSTEAD, IT SIMPLY ASKS PRIVATE LENDERS TO LEND ABOUT $1 BILLION TO THE

FEDERAL GOVERNMENT ON THE PROMISE THAT THE GOVERNMENT WILL REPAY THE LENDERS THEIR PRINCIPAL PLUS AFFORD THEM INTEREST FROM THE REVENUES MADE THROUGH THE SALE OF CLINCH RIVER ELECTRICITY. WITHOUT THE PLAN THESE REVENUES WOULD HAVE GONE INTO THE U.S. TREASURY. WITH THE PLAN THEY ARE SURRENDERED TO THESE PRIVATE LENDERS. MORE IMPORTANT, BECAUSE PRIVATE LENDERS CHARGE MORE FOR THE MONEY THEY LEND THAN WHAT THE U.S. TREASURY WOULD CHARGE CONGRESS, THIS SCHEME ADDS TO THE PROJECT'S COST. IN FACT, THE AUTHORS OF THE PLAN ADMIT THIS IN THEIR OWN REPORT--"PRIVATE BORROWING IS ALWAYS MORE COSTLY THAN FULL GOVERNMENT FINANCING SINCE THE FEDERAL GOVERNMENT NECESSARILY COMMANDS THE LOWEST BORROWING COST." HOW MUCH MORE? MY OWN STAFF ESTIMATES THAT IT WILL ADD AT LEAST $150 MILLION AND PERHAPS AS MUCH AS $300 MILLION TO THE COST OF THE PROJECT AND THIS IS ASSUMING THAT NOTHING GOES WRONG. IF ANYTHING DOES--IF THE PLANT'S OPERATION COSTS ARE MORE THAN EXPECTED, IF THE PLANT COSTS MORE THAN EXPECTED, IF IT COMES ON LINE LATER THAN EXPECTED, IF THE REVENUES FROM THE SALE OF ELECTRICITY ARE LESS THAN EXPECTED--THE GOVERNMENT MUST PICK UP THE DIFFERENCE AND PAY OUT MORE MONEY TO THE LENDERS. BESIDES THIS $1 BILLION LOAN, THE ONLY NEW ELEMENT THE PLAN OFFERS IS $150 MILLION IN EQUITY SHARES THAT THE PLAN'S AUTHORS ADMIT WILL BE SOLD NOT ON THE BASIS OF THE REACTOR'S VALUE, BUT ON THE BASIS OF THE TAX BREAKS ASSOCIATED WITH THE SHARES THEMSELVES. HOW MUCH WILL THESE TAX BREAKS COST? THE TREASURY WILL LOSE AS MUCH MONEY FROM THE TAX BREAKS GIVEN AS THE TREASURY MIGHT GAIN FROM THE $150 MILLION IN EQUITY SHARES. THEREFORE THE OFFER TO SELL THESE EQUITY SHARES DOES NOT INCREASE

PLAN ANSWERS CONGRESS' REQUEST FOR REDUCING BUDGET REQUIRMENTS FOR THE PROJECT. THEY ARGUE THAT IN THE EARLY YEARS OF THE PLAN, THE PLAN REDUCES WHAT CONGRESS WOULD OTHERWISE HAVE TO APPROPRIATE FOR THE PROJECT. THIS, HOWEVER, IS NOT THE POINT. THEIR PLAN DOES NOT REDUCE BUDGET REQUIREMENTS AS A WHOLE FOR THE PROJECT AND IN FACT INCREASES THEM. THUS, WHATEVER DOE AND BRC THINK, THEY CLEARLY MISUNDERSTOOD WHAT CONGRESS EXPECTED OF THEM.

* ALTHOUGH DOE SAYS IT SUPPORTS THIS PLAN, DOE HAS REFUSED TO SUBMIT IT AS LEGISLATION AND ITS SUPPORTERS ARE ACTUALLY TRYING TO AVOID A HOUSE VOTE BY RUSHING IT THROUGH AT THE LAST MINUTE WITHOUT DEBATE ON THE CONTINUING RESOLUTION IN THE SENATE. GIVEN THE WEAKNESS OF THE PLAN, THIS IS UNDERSTANDABLE. HOWEVER, IT IS NOT EXCUSABLE AND I BELIEVE IT WILL NOT WORK. YESTERDAY SENATORS BUMPERS, BOSCHWITZ, HART AND I ASKED THE ENERGY AND NATURAL RESOURCES COMMITTEE TO HOLD HEARINGS ON THE ALTERNATIVE FINANCING PLAN BEFORE THIS LEGISLATION COMES TO THE FLOOR. IN A SEPARATE DEAR COLLEAGUE TO THE SENATE, WE WARNED THAT IT WOULD BE A MISTAKE TO TRY TO BRING THIS MATTER TO THE SENATE FLOOR WITHOUT SUCH HEARINGS SINCE IT WOULD REQUIRE EXTENSIVE DISCUSSION AND DEBATE.

* AFTER ONE YEAR OF PROMISES, TALK, AND STUDY, THE INDUSTRY HAS NOT RAISED ONE ADDITIONAL CENT FOR THIS PROJECT--MAKING IT 6 YEARS SINCE IT LAST BOTHERED TO EVEN SOLICIT FOR CONTRIBUTIONS. WE ASKED FOR MORE INDUSTRY MONEY TO OFFSET THE FEDERAL COST OF

THIS PROJECT A YEAR AGO. WE STILL HAVE NO MONEY OR EVEN THE PROMISE OF MONEY. EARLIER THIS YEAR THE ASSISTANT SECRETARY FOR NUCLEAR ENERGY--SHELBY BREWER--ADMITTED THAT THE PLAN AS IT NOW STANDS SIMPLY "MOVES MONEY AROUND IN TIME" AND THAT INDUSTRY WOULD HAVE TO COME UP WITH AT LEAST $500 MILLION IN VENTURE CAPITAL TO PERSUADE CONGRESS. I TEND TO AGREE. INDEED, WITHOUT THIS, CONGRESS SHOULD DO NOTHING SINCE BOTH THE HOUSE AND THE SENATE AGREED IN CONFERENCE THIS JUNE NOT TO PERMIT ANY FURTHER FUNDING FOR THE PROJECT UNLESS AND UNTIL "VIABLE AND SUBSTANTIVE" COST-SHARING OF THE PROJECT IS ENACTED. IN PLAIN ENGLISH, IF INDUSTRY TRULY WANTS TO SAVE THIS PROJECT, IT SHOULD PUT MONEY WHERE ITS MOUTH IS. TALK COMES CHEAP.

Mrs. LLOYD. Thank you very much, Senator Humphrey.

Did I perhaps misunderstand you would rather go back to the old financing plan than the alternative financial—financing——

Senator HUMPHREY. No, indeed.

Mrs. LLOYD [continuing]. Program?

Senator HUMPHREY. I oppose this project because it is unnecessary, even by the statements of the Energy Secretary. I believe, as Congressman Gregg does, my worthy colleague from New Hampshire, that the administration ought to be—ought to be consistent, that if we believe in allocation of resources by the marketplace, including in the field of energy, that we have no business engaging in a project of this——

Mrs. LLOYD. I know that you certainly share my regret that the—the delays pronounced by the Carter administration did cost this program about $950 million.

Senator HUMPHREY. Yes.

Mrs. LLOYD. I certainly regret this.

I haven't—this is just my 9th year in the Congress, so I haven't been involved with this program as long as you have or other Members that are—that are here, or other members of industry that are here.

But I have a very distinguished constituent in my district, Dr. Alvin Weinberg, who has been very familiar with this project, and has been involved in this program for about 42 years. And he stated that, while he felt that the arguments of the Rand Corp., were very plausible, he said—but he really felt that the report that you were referring to really missed the essential justification for the pursuit of breeders in general and the completion of CRBR, that it—that this is an inexhaustible energy source in the same sense as solar or fusion.

Now, we are putting about $600 million a year into fusion, and then we have about $600 million more tax rebates for our solar programs. I think you will agree with this.

But we are committed as a nation, to the achievement of inexhaustible energy sources as a prime national technological goal. And this is not unlike our commitment to space exploration.

So the central theme—do we need Clinch River today? Do we have Clinch River today? We do not. We agree with you. But this is not the justification for the pursuit of Clinch River.

Now we have a dam down in my area. It's called the Norris Dam. It was built about 50 years ago. Now, I'm sure that a lot of people took a lot of flak for building that dam 50 years ago. Maybe I would if I'd been there. But I'm thankful it's there today, because it's providing us with a cheap source of electric energy. And I think that, about 50 years from now, I think that your grandchildren and my grandchildren are going to say, "Hey, thanks for building Clinch River, because you've given us a cheap source of energy compared to fossil energy," because the breeder reactors and our reactors are true on the front end.

They are very—they—it's very costly. They're going to cost us a lot of money. But we really don't have a fossil technology to compare this to, because we're looking, as we'll look ahead, sure, the experience is pretty good on the front end. But we are seeing that we have an inexhaustible source of energy that the costs for keeping in operation are going to be very low down the line. And I do believe that, as we look ahead, if we have the foresight and the judgment and the wisdom, that we'll be thanked 30 years from now for the wisdom of going ahead with breeder reactors in general.

Senator HUMPHREY. May I respond?

Mrs. LLOYD. You may respond.

Senator HUMPHREY. Briefly. Briefly. Well, the difficulty, Madam Chairman, is that the purpose of a demonstration project is to advance the commercialization of some technology which is on the threshold of commercialization. And all of the expert testimony I have seen, from the blue ribbon—what is it called—Energy Committee that advises the Secretary of Energy, and so many others, that their opinion is that because of the high capital costs, construction costs of breeder reactor technology, and the relatively low cost of uranium and its supply, its plentitude, that breeders simply can't compete with light-water reactors and will not be able to until well after the turn of the century. So, at the very least, we're commercializing something well in advance of its readiness for commercialization.

Mrs. LLOYD. But this is a long, tedious, and expensive process to get the development of this, that we have to have at the turn of the century.

Mr. WOLPE. If I might just add a comment, Madam Chairman. The issue really is how can we most efficiently make investments that will most quickly and cheaply displace our dependence upon petroleum. That's the question.

And I think that, too frequently, we kind of take the cart before the horse. We are kind of indiscriminately throwing dollars behind various technologies in the hope that they will yield a cost-effective benefit at the end of the line.

I would submit that a more rational approach would be, first of all, to identify what our energy requirements are in this country for heating, for transportation and the like, and then to determine what's the most efficient means of meeting those energy requirements. The economic argument that has been advanced with respect to the breeder is that there is simply a lot of other investments that will much more cheaply, much more quickly meet our energy requirements and displace petroleum.

So that the question is not would it not be desirable. It would be nice to do everything. We have to make choices which——

Mrs. LLOYD. Well, I think the issue is just not displacing oil, but providing sufficient sources of energy for the future. No, it's not quick. And, no, it's not inexpensive. But it is necessary.

I know my time has expired. Mr. Ottinger.

Mr. OTTINGER. Thank you, Madam Chairman.

Mr. Morrison, it always infuriates me to hear the advocates of this project, the advocates of nuclear energy, the industry, the utilities, try to equate nuclear energy as a whole—this project in particular—with the oil shortages, energy crises that we've experienced, as you did to talk about the long lines at the gas pump.

I agree 100 percent we ought to be addressing those issues and that crisis still maintains. But nuclear energy and this project have virtually no impact on our dependence on imported oil. We only use 4 percent of our oil supplies for the manufacture of electricity. It is virtually irrelevant.

It seems to me that that is a false premise on which to advance this project. You can't run automobiles on electricity, the conversion—you've got to have an economic price. The cost conversion would be just enormous.

So it seems to me that's a shibboleth that ought to be struck down, and it has to be over and over again. This project only pertains to the production of electricity. It is virtually irrelevant to any future oil shocks we might experience.

The financing plan for this project, it seems to me, is an utter sham. It is brought to us on the basis that it will provide additional private investment to replace Government investment. The fact of the matter is that the Federal Government remains an absolute guarantor of all of the private financing.

Secretary Hodel indicated that the $150 million that's coming—to come in the form of equity financing is at risk. And that was a plain untruthful assertion. That private financing, equity financing, is absolutely guaranteed. It's guaranteed to be returned in the form of the tax incentives that are provided on the entire project, on the entire private investment.

And should the tax laws be changed, then the Government has provided in this document that is put forward by the Department of Energy, the Clinch River breeder reactor alternative financing, it says Government assurances that all tax credit deductions and other tax incentives related to the privately financed portion of the project will be available to the private investors as planned. Government contracts to provide sufficient funds to make appropriate repayments to private equity investors if tax incentives are not made available as planned. If the project does not go to operation, the Secretary has already said, well, we'll pay back all the equity people with interest. If it does go forward, they're guaranteed a return on their investment through the tax vechicle, and if the tax vehicle isn't available, then the Government guarantees to make that up.

So there is no private capital being put forward on this project. The Government's being asked to pick up a turkey.

Now the basic question that has to be addressed is, Is this needed as a research and development project? The Chairwoman makes that as the principal—is this huge investment needed for our future? The world is awash in uranium at the present time. The people in the West—Senator Domenici is arguing that we should put import quotas on imported uranium so that we can maintain our industry.

Electricity—and we're just talking about electricity—from light-water reactors is presently costing less than half of what a breeder reactor would cost. It is because of this the French are not sailing forward. The French had planned for six Superphenix reactors, and they are back to just one, because they can't sell the breeder reactor-produced power at a competitive cost. It is like the Concord, which I think Senator Humphrey has referred to analogy before. It is a marvelous new technology. It just isn't economic. The British and the French had to abandon it, and we would be wise if we abandon this very quickly.

Any of you may comment on those remarks. Congressman Morrison, I particularly referred to you, so you might want to——

Mr. MORRISON. Madam Chairman, I know that time is exhausted by the question, but I would like a quick shot. [Laughter.]

Mrs. LLOYD. Please. As with our other panelists, we will allow you time to reply.

Mr. MORRISON. I recognize that there is a limited transferability in the oil figures which, I suppose, we have a tendency to use when it seems to support our argument.

I do believe, however, that I see even in the Northwest where we have a hydro base that you and I have been discussing in your hearings on another subject, that we see in the future plans for combustion turbines, for instance, say, as a fill-in, and so greater utilization of fossil fuels. I also believe that our coal resources, instead of being utilized for generating electricity, perhaps could best be reserved for the opportunity to create fluid fuels which could be used for transportation. I know that this committee has done quite a little bit on research on electrical cars. I think there is more transferability than the 4-percent figure might allow.

Your basic question, and I'll skip the financing part, is, is this a necessary part of research and development? And I—the first question I asked before I even got to Congress of people at Hanford is, is it necessary that we make the step to Clinch River? Can't we just jump from where we are now up to a commercial project? They say, in the best interest of safety and efficiency for America's utilities, that no, we cannot, that normally, scientifically, you do things with a multiplier of three times, and Clinch River is essentially a 2½-times multiplier of the size of the currently working fast flux test facility. Then from Clinch River would be another three times extrapolation to get to the commercial size production unit that some day will be an essential part. Maybe not until after the year 2000, but I think we neglect our responsibility of looking to the future if we think that something else is going to fit into that timeframe.

I agree that we need to proceed with this. It's a worthwhile investment, even though it does not seem like it in today's terms, but in terms of the next century, it most certainly will be essential.

Mr. **Wolpe**. Madam Chairman, could I also——

Mrs. **Lloyd**. Thank you. I believe that time has expired.

Mr. Lundine now has the time. Mr. Lundine.

Mr. **Lundine**. No questions, Madam Chairman.

Mrs. **Lloyd**. Mr. Walker.

Mr. **Walker**. Far be it for me to give up 5 minutes for either questions or statements, but I have no questions either.

Mrs. **Lloyd**. Mr. Hall is not here.

Mr. Lowery.

[No response.]

Mrs. **Lloyd**. Mr. Chandler.

Mr. **Chandler**. No questions.

Mrs. **Lloyd**. Mrs. Schneider.

Mrs. **Schneider**. I would like to commend each of the panelists for their testimony this morning. I found it most interesting.

But, in particular, I would like to commend you, Senator, for your very strong leadership in the Senate and for your active participation in this particular issue. I must admit that when it has been necessary for finding an ally insofar as exposing this so-called cost-sharing plan to the taxpayers and bringing the information to the forefront, you have been certainly a very strong leader in assisting on the Senate side to bring this information forward.

I would like to ask, Madam Chairwoman, with your permission, that we include the comparison that the Senator has presented to us this morning of the analysis of the WPPSS project and the Clinch River project. I hope I have your permission, Senator, to include it.

Mrs. **Lloyd**. How long is this comparison?

Senator **Humphrey**. One page.

Mrs. **Lloyd**. One page. Without objection, it will be made a part of the record.

Mrs. **Schneider**. Thank you.

[The information follows:]

[From the Congressional Record, Sept. 14, 1983]

WPPSS AND THE CLINCH PLAN—SOME UGLY SIMILARITIES

Both WPPSS federal bailout supporters and backers of the Clinch River alternative financing plan have been anxious to avoid holding Senate hearings and fully debating these schemes' merits. This is no accident. Indeed, in at least 5 respects both schemes are disturbingly similar:

1. Like WPPSS, the Clinch financing plan depends on Government agency guaranteed bonds that otherwise would not sell or not sell very well in financial markets. WPPSS Units 1, 2, 3 bonds are backed by the Bonneville Power Administration (BPA), a federal entity. The Clinch financing plan depends on direct federal guarantees covering $1 billion in bonds.

2. Like WPPSS, the success of the Clinch financing plan depends on the validity of several risky assumptions that (1) the plant will not experience any further cost overruns, (2) its completion date will slip no further, (3) the electricity it will produce will be needed and bought at prices high enough to repay those who financed the plant's construction. These assumptions proved to be unsound in the case of WPPSS and as a result, WPPSS defaulted on 2 of the system's 5 reactor units. The

assumptions are no sounder in the case of Clinch. The only difference with the Clinch plan is that instead of having the bondholders or the region's rate payers pay for default, federal taxpayers get stuck with the tab.

3. Like the supporters of WPPSS, Clinch supporters are inattentive to the danger that the project's financing cannot be covered by the revenues the reactor might produce. And in both cases the reason why is the same—the project supporter's believe their projects are so costly and so involve the public that they can force government to pick up the tab no matter how poor an investment these projects turn out to be.

4. Both WPPSS and the Clinch plan wrongly assume nonexistent local electricity demand. Unlike the backers of the Clinch Plan, though, the WPPSS commissioners can claim their original investment decisions were based on the best estimates of the time. DOE cannot claim this since TVA itself admits that it has no need for additional power through 1995 and just cancelled five nuclear power plants at considerable cost. In addition, the Congressional Research Service projects a significant surplus of capacity in the regions that might be served by Clinch River.

5. In both cases—WPPSS and the Clinch Plan—the key beneficiaries of the bailouts are investment brokers and private contractors who make money whether the projects prove to be economically sound or not. Thus, Westinghouse itself stands to gain at least $50 million on just one fixed fee contract (this for work on the reactor's troubled steam generator). In addition, Westinghouse is the prime contractor for the reactor's steam supply system. Westinghouse refuses to reduce the amount of guaranteed fee or profit it will make on these contracts. As for WPPSS, in 1981 Merrill Lynch underwrote an additional $750 million in WPPSS bonds and earned a $22.5 million commission—the largest in the firm's history. It is not surprising, then that Merrill Lynch is willing to sell government backed Clinch River bonds and shares.

Mr. MORRISON. Madam Chairman, might I ask—excuse me—if the gentlelady will yield? Might I also submit some information on the fact that the supply system in the Clinch River——

Mrs. LLOYD. Without objection.

Mr. MORRISON [continuing]. Do not mesh——

Mrs. LLOYD. Without objection.

Mr. MORRISON [continuing]. That they are totally different.

Mrs. LLOYD. Without objection, these documents will be made a part of the record.

[The information follows:]

CRBRP Contrasted with WPPSS

ISSUE:

How does CRBRP differ from the current situation at WPPSS?

ANSWER:

- WPPSS is a consortium of Municipal Utilities, Public Utility Districts, and Rural Electric Cooperatives in the Northwest formed from the purpose of managing the design, construction, and operation of 5 LWR's in the State of Washington.

- There are differences in ownership of each plant. For example, Unit #1 has 104 participants, #2 has 94, #3 has 103 including 4 investor-owned utilities, and #4 and #5 have 88 participants. The WPPSS governing Board of Directors is comprised of 23 participants from the State of Washington.

- The 23 member WPPSS board is comprised of municipal officers, local PUD managers, and others not experienced in managing large nuclear projects. The BRC proposed American Energy Development Corporation (AEDC) governing board would be directed by experienced investor-owned utility officers. The CRBR Project is managed by a unique team of scientists and engineers; design work is nearly complete, three fourths of the major components are complete or on order, and the licensing is advanced to the stage that construction can begin as early as November 1983.

- The WPPSS participants' interest have been primarily assuring adequacy of long term electric power to their own service areas. CRBRP contributors are not seeking CRBR electricity sales; but are interested in technology demonstration of long-term power generation options.

- CRBRP is being built as a medium sized (375 MWe) development and demonstration project; the 5 WPPSS are large (6000 MWe) standardized LWR's being built to supplement hydroelectric power.

- CRBRP will be easily integrated into the regional power grid because the 375 MWe is small relative to the TVA distribution capabilities. Furthermore, TVA has a much larger distribution network than BPA. This is sharply contrasted with WPPSS where the cost of building the plants is already having a major impact on electricity costs.

WPPSS vs CRBR

ISSUE:

Isn't CRBR just another WPPSS?

ANSWER:

CRBR and WPPSS differ significantly.

- Nature of Projects:

  CRBR - Federal R&D Project, private investment supports Federal Government.

  WPPSS - Commercial Projects with Federal backing. Built to meet anticipated growth demand.

- Regional significance of Projects:

  CRBR - Southeast region:

  - CRBR less than .2% of Southeastern Electric Reliability Council (SERC) capacity in 1990.
  - Electric costs in SERC sufficient to support CRBR debt without increases to rate payers.
  - Capacity easily absorbed in region, not dependent on load growth.

  WPPSS - Northwest:

  - WPPSS 12% of Northwest Power Pool.
  - Load growth decrease directly impacted need for WPPSS.
  - Region electric price very low from hydro.
  - WPPSS costs significantly impact costs to rate payers.

- Failure of WPPSS due directly to low load growth factor which will not impact CRBR.

Mrs. SCHNEIDER. Thank you. I have no further questions.

Mrs. LLOYD. Mr. Brown.

Mr. BROWN. Madam Chairman, could I ask Mr. Wolpe if he would proceed with his response that he indicated he wanted to make to——

Mr. WOLPE. Thank you, Mr. Brown.

I just simply wanted to reinforce the point that was being made by Mr. Ottinger, that the notion that this new plan represents an increase in the private sector contribution, that's an absolute sham. It simply is not so.

And I would draw attention of the members of the committee to a press conference that was held recently involving Mr. Miner Warner, Salomon Bros. vice president, and Mr. James O'Connor, the chairman of the Commonwealth Edison, who conceded that the industry's equity contribution, that $150 million that was being referred to, would come from tax benefits provided on the investment, not from venture risk capital.

I might add that, in that same press conference, Mr. O'Connor went on to say that although——

Mrs. LLOYD. Mr. Wolpe.

Mr. WOLPE. Uh-huh.

Mrs. LLOYD. Mr. Warner is in the audience. I'm sure he will address this issue in his testimony.

Mr. WOLPE. Gladly. I just thought, as a reminder of his testimony, that it would be useful to have that for the record today.

Mr. O'Connor went on to say that, although he's confident that the project would be built and run successfully, it would be unfair to ask private companies to assume the risks associated with the project.

The real question is whether or not the utility industry has sufficient confidence in this project to assume the additional risks that it ought to, or whether that's going to be simply—simply maintained—maintaining that burden for the taxpayer.

Thank you.

Mrs. LLOYD. Mr. Gregg.

Mr. GREGG. Thank you very much, Madam Chairman.

Mrs. LLOYD. Pardon me, Mr. Brown, were you finished?

Mr. BROWN. That's correct.

Mr. GREGG. I would certainly want to yield to the gentleman from California.

Mrs. LLOYD. Pardon me. I thought you were yielding your time so that Mr. Wolpe could reply. In all fairness, please proceed.

Mr. BROWN. Madam Chairman, you're correct.

Mr. GREGG. Thank you, Madam Chairwoman.

Mrs. LLOYD. Mr. Gregg.

Mr. GREGG. I would just like to reiterate what the gentlelady from Rhode Island has said, and appreciate our senior Senator from New Hampshire whom we're so proud of in leading this fight has come here today to testify and express his thoughts on——

Mrs. LLOYD. Please use your mike, Mr. Gregg.

Mr. GREGG. I am. It's not working.

Senator HUMPHREY. I want everybody to hear this. [Laughter.]

Mr. **Gregg**. And beyond that, I would just say that there's really not a great deal that I can add further to the discussion that's already taken place, so I will yield back my time.

Mrs. **Lloyd**. Thank you very much, Mr. Gregg.

I want to thank you distinguished gentlemen for your testimony.

Mr. MacKay, do you have questions?

Mr. **MacKay**. No questions.

Mrs. **Lloyd**. Since we do have a vote on right now, I think we will stand in recess for about 10 minutes, and we will be back to resume our hearings.

Thank you, panel, for being with us, for your time, for your excellent testimony.

[Recess.]

Mrs. **Lloyd**. The subcommittee will come to order.

Thank you for your patience and staying with us. Those very necessary votes that are part of our responsibilities of Members of Congress, but fortunately today, I think we've only had two votes since our hearings have begun. I can think of other hearings when we've had 10 or 12 during the same timeframe. So, I think that has certainly been on our side, since we do have a limited amount of time.

We are very happy now to have Mr. Dexter Peach as our next witness, who is Director of Resources, Community and Economic Development Division of the U.S. General Accounting Office.

We welcome you, and please proceed with your testimony.

STATEMENT OF J. DEXTER PEACH, DIRECTOR, RESOURCES, COMMUNITY AND ECONOMIC DEVELOPMENT DIVISION, U.S. GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY ROY SHEELY, ATLANTA REGIONAL OFFICE, U.S. GENERAL ACCOUNTING OFFICE; AND KEN LIGHTNER, WASHINGTON, D.C., STAFF, U.S. GENERAL ACCOUNTING OFFICE

Mr. **Peach**. Madam Chairman, I would like to first introduce the colleagues that I've asked to join me at the table today.

Mrs. **Lloyd**. Please identify them.

Mr. **Peach**. They have been involved with work we have done in the past on breeder reactor-related issues. Mr. Roy Sheely of our Atlanta Regional Office——

Mrs. **Lloyd**. Mr. Sheely, we are happy to have you with us.

Mr. **Peach** [continuing]. And Mr. Ken Lightner, who works on our Washington staff.

Mrs. **Lloyd**. Mr. Lightner, thank you for being with us.

Mr. **Peach**. If my full statement will be included in the record, I'll proceed to summarize briefly.

Mrs. **Lloyd**. Your complete statement is in the record, and you may proceed as you wish.

Mr. **Peach**. All right.

Since March 1983, we have been reviewing issues related to how increased private financing can be provided for the Clinch River breeder reactor. We have reported on the financing framework which DOE and the Breeder Reactor Corporation presented in March 1983, and the more recent BRC financing plan which DOE transmitted to the Congress in August 1983.

Now DOE and the BRC concluded that with appropriate Government guarantees, the CRBR project should be able to attract an additional $825 million in new construction financing; $675 million would result from the sale of bonds, and $150 million would be raised from the sale of equity shares. An additional $1.75 million would come from the remainder of already committed utility contributions, plus interest earned on such contributions while held in escrow. The bonds would be repaid from electricity sales revenues and the equity shareholders would realize all tax benefits available under the existing tax code on the total new private investment of $825 million.

Also, the equity investors may be assigned a share of any excess profits resulting from the sale of CRBR-generated electricity. Our overall assessment of the DOE and BRC approach is that private financing represents a tradeoff between short-term budgetary savings and possible higher overall Government costs for the project.

It should be kept in mind that, with the possible exception of the funds already committed by the private utilities, the Government would maintain all project risks under private financing just as it does under Government financing. The Government initially assumed this risk because the CRBR is a demonstration project representing one further step in a long-term research and development process that is intended to make breeder reactors available as a future source of electricity.

As an R&D project, the future of the breeder program in general, and CRBR in particular, raced on a—rests on a broad range of issues. Among these issues are CRBR's role in breeder R&D, project costs and related budget impacts, the need for and timing of commercial breeder reactors, the projected availability of uranium ore to fuel the current generation of light-water reactors, and the projected demand for electricity and nuclear power's role in meeting that demand.

I might add, Madam Chairman, you've already heard discussion this morning with respect to a number of those related issues.

What I would like to emphasize is that GAO takes no policy position on building the CRBR. Rather, we believe that the decisions about its future require a combination of economic, value, and political judgments by the Congress against the backdrop of this wide range of issues. And we hope our testimony today can add to Congress' understanding of those issues.

[The prepared statement of Mr. Peach follows:]

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

FOR RELEASE ON DELIVERY
Expected at 9:00 A.M.
Thursday, September 15, 1983

STATEMENT OF
J. DEXTER PEACH
DIRECTOR
RESOURCE, COMMUNITY AND ECONOMIC DEVELOPMENT DIVISION
BEFORE THE
SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY
ON
PRIVATE FINANCING FOR THE CLINCH RIVER BREEDER REACTOR

Madam Chairman and Members of the Subcommittee:

We welcome the opportunity to be here today to discuss the proposed private financing for the Clinch River Breeder Reactor (CRBR). During the past few months, we have issued two reports on the Department of Energy's (DOE's) efforts to obtain additional private financing for the CRBR project.[1]

In March 1983, DOE and a task force of the Breeder Reactor Corporation (BRC)--a company representing utilities who have contributed funds to the CRBR project--issued reports that described a potential framework for obtaining private financing for the CRBR. On May 12, 1983, we reported, that they

--represented the beginning of a process that would require much more work before a detailed private financing proposal is developed,

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[1] Analysis of Studies on Alternative Financing for the Clinch River Breeder Reactor" (GAO/RCED-83-151, May 12, 1983) and "Comments on a Plan for Obtaining Private Financing for the Clinch River Breeder Reactor" (GAO/RCED-83-226, Aug. 22, 1983).

--represented a trade-off between short-term budgetary savings against possible higher overall Government costs for the project, and

--provided insufficient information to adequately analyze the tax benefits associated with attracting private financing.

On August 1, 1983, DOE submitted to the Congress a more definitive financing plan which was also prepared by the BRC task force. We reviewed this plan and provided you with our comments on August 22, 1983.

OVERVIEW COMMENTS ON FINANCING PLAN

The August plan provides more information on project organization, debt financing, equity financing, and tax benefits. However, the basic concepts remain the same--that with Government guarantees, the revenues from CRBR-generated electricity, and available tax benefits, investors could be found to finance a portion of the remaining CRBR cost. The private sector financing would produce budgetary savings during the CRBR's construction. But, such savings would be a trade-off against either future reductions in Federal revenues or additional budget outlays. Specifically, the revenues expected to be produced from the sale of CRBR-generated electricity will be used to pay back private investors. If, however, the revenue is inadequate, the plan calls for the Federal Government to provide funds necessary for operating expenses and repayment of the private investment.

The latest plan calls for the project to be a joint venture comprised of the Federal Government and a partnership of private investors. The Secretary of Energy--following enactment of appropriate legislative authorization--would transfer title of the CRBR powerplant to the joint venture. The Government and the private investors would own the project in proportion to their respective investments.

About $1.66 billion have already been spent on the CRBR project. DOE currently estimates that an additional $2.5 billion will be required to complete the project. The BRC task force plan calls for the joint venture to raise about $1 billion toward that remaining cost. About $675 million of the $1 billion would be provided from debt (loans and bonds) financing while about $150 million would be raised by selling equity shares in CRBR. The remaining $175 million would be the remainder of the contributions, including any interest earned on the contributions while held in escrow, pledged by electric utilities at the outset of the project.

DEBT FINANCING

The plan states that the initial private sector debt financing would be provided from $675 million in short-term (1984 through 1990), 10-percent construction loans. BRC task force officials believe these loans will be available from several large private lenders. The construction loans (including interest) would then be retired by having the joint venture issue 30-year bonds in 1990. BRC task force officials estimate that the bonds would carry a 10-percent interest rate and would be underwritten by investment bankers. The 30-year bonds would be retired using revenues from the sale of CRBR electricity. The plan states that interest paid to the bondholders would be taxable.

BRC task force and investment banking officials point out that the 10-percent interest rate anticipated for the construction loans and the 30-year bonds is only an estimate. The actual interest rate paid will reflect market conditions at the time of issuance. BRC task force officials have stated that if market interest rates are higher than 10 percent, a share of CRBR power sale revenues may be offered to investors to maintain the 10 percent rate.

EQUITY FINANCING

The BRC task force also anticipates raising $150 million by selling equity (partnership) shares in the CRBR. Shares will be sold by the investment bankers, although the plan does not specify who might purchase the shares. The return to the equity investors will be in the form of tax benefits and a share of the CRBR revenues available after the bondholders and operating expenses are paid. Task force officials stated that the distribution of such revenues will be made in accordance with a ratio that will be determined when the shares are sold.

TAX BENEFITS

Tax benefits for the equity participants are better defined in the task force's new plan than in the March 1983 reports. The new plan specifies that the participants will receive only those tax benefits available to investors in any similar private project. The plan states that the equity participants will be entitled to investment tax credits and tax deductions for accelerated depreciation; research and development expenses; and deductible costs, such as the interest paid by the joint venture on the loans. The equity shareholders' tax benefits would be based on the total private investment--both debt and equity investment combined--not on the equity share alone. That is, for an equity investment of $150 million, the investors would receive tax benefits on the total new private investment of $825 million (the $1 billion private investment minus the remainder of the utilities' pledged but unpaid contributions). Because the investors and their respective tax obligations are currently unknown, the net effect of private investment in the CRBR on Federal tax revenues is uncertain at this time.

UTILITY CONTRIBUTIONS

The plan also considers $175 million in utility contributions to be part of the $1 billion private investment package. This is not, however, a new contribution but the remaining undelivered portion of the utilities' original $257 million pledge plus the interest utilities' contributions have or will earn while in escrow.

GOVERNMENT FINANCING

The plan envisions that all costs to complete the project over and above the $1 billion private investment (DOE estimates these to be $1.5 billion) will be paid by the Federal Government. Thus, the private financing plan would require the Congress to enact a $1.5 billion appropriation, with obligations to be made over the next 7 or more years as needed for plant construction. In the event of cost overruns, construction schedule delays, operating problems, or insufficient electric power sale revenues, the plan calls for the Federal Government to provide all additional funds.

GOVERNMENT GUARANTEES AND RISKS

The plan also calls for the Federal Government to guarantee that the equity investors' tax benefits associated with the CRBR will be realized and that, if CRBR is not completed, licensed, or operated as planned, the equity investors and bondholders will be repaid--both their investment and a rate of return on their investment to be agreed upon during future negotiations. Thus, the March reports and the more recent plan emphasize that private financing can only be obtained if the Federal Government retains all project risks by guaranteeing that the Federal funding will be provided when needed, the CRBR will be built and licensed on schedule, and it will operate and produce revenues as projected.

Before concluding my statement one basic point must be made. Over the past few years, we have issued numerous reports dealing with various aspects of the breeder reactor research and development program and more specifically with the CRBR. We have consistently pointed out that the breeder program is a research and development program and that construction of a demonstration plant such as the CRBR or a similar demonstration project is a logical step in the research and development process.

In that context, discussion concerning the future of the breeder program in general and CRBR in particular rests on a broad range of issues. Among those issues are CRBR's role in breeder reactor research and development, project costs and related budget implications, the need for and timing to bring breeder reactors on-line, the projected availability of uranium ore to fuel the current generation of light water reactors, and projected demand for electricity and nuclear power's role in meeting that demand. Thus, decisions about the future of the CRBR ultimately require economic, value, and political judgments by the Congress against the backdrop of a wide range of issues.

This concludes my prepared statement. We will be glad to answer any questions.

Mrs. LLOYD. Thank you very much, Mr. Peach. We appreciate your being with us and your forthright statement and the time that you spent on this issue and you have spent in previous years.

I think also, in our justification for the breeder, we have to go back to the really essential justification, that we are looking as a nation for an inexhaustible energy source. This is one—one of our goals in Congress as we also look to solar and to fusion as well. But this is one of our national goals, to achieve this objective. This is not a short-term project.

In your report, you mention that the $825 million reduction in Federal appropriations is traded off against our future projected revenues.

Mr. PEACH. Yes.

Mrs. LLOYD. OK.

But don't you agree that if we were to cancel this project, that there would be no future project revenues to pay the Treasury?

Mr. PEACH. No. If the project were canceled at this point in time, certainly there would be no flow of revenues coming from it.

Mrs. LLOYD. So there's a little better balance.

Mr. PEACH. That's right. Their flow—their flow of revenues is prefaced on successful operation of the project beginning———

Mrs. LLOYD. So it's not an equal tradeoff from one end to the other, because certainly there would be no revenues to pay off if we were to cancel the project in addition to the commitment we made already.

Mr. PEACH. From that standpoint, no.

Mrs. LLOYD. Thank you very much.

I think that you sort of hit this committee at the right time. I think everybody's taking a lunch break. So I think we'll afford you the same opportunity. Thank you for being with us, and we appreciate your testimony.

Mr. PEACH. Thank you, Madam Chairman.

Mrs. LLOYD. I'm sure that other members will probably have the statements they'd like to submit for providing———

Mr. PEACH. Right. If there are any further questions for the record, we would certainly be pleased to respond.

Mrs. LLOYD. Thank you very much.

Mr. PEACH. Thank you.

Mrs. LLOYD. Our next witness is Mr. James J. O'Connor, Chairman of Breeder Reactor Corporation, a gentleman who has spent a great deal of time on this project, a very knowledgeable gentleman. We're very happy to have Mr. O'Connor with us today.

It looks as if Mr. O'Connor perhaps has gone to lunch at the present.

From the audience. Madam Chairperson, I'm sure he just stepped out for a few minutes.

Mrs. LLOYD. He just stepped out. Well, we will stand—the next witness is a panel, so we will stand in recess for just a few minutes until Mr. O'Connor reappears. He comes back—I'm sure he didn't anticipate that Mr. Peach would get off so quickly.

[Recess.]

Mrs. LLOYD. Do we have the panel here at this time?

We will proceed with our panel. Mr. Jerome Katzin is manager—managing director of Lehman Bros., Kuhn, and Loeb. He's accompanied by Mr. John Barr, Mr. Frederick Potter, and Mr. Miner Warner.

I think that we—that the four panel members will provide a single written statement which Mr. Katzin will summarize.

STATEMENT OF JEROME S. KATZIN, MANAGING DIRECTOR, LEHMAN BROS., KUHN LOEB, INC., ACCOMPANIED BY JOHN W. BARR, PRINCIPAL, MORGAN STANLEY & CO., INC; FREDERICK S. POTTER, VICE PRESIDENT, MERRILL LYNCH CAPITAL MARKETS; AND MINER WARNER, VICE PRESIDENT AND MANAGER, SALOMON BROS., INC.

Mr. KATZIN. Thank you, Madam Chairman.

Mrs. LLOYD. We're happy to have you here, Mr. Katzin with your associates.

Mr. KATZIN. Let me introduce them to you, if I may.

Mrs. LLOYD. Would you please identify your associates.

Mr. KATZIN. With me today forming this panel to respond to your questions are Frederick S. Potter, who is the vice president of Merrill Lynch Capital Markets; John W. Barr, who is the principal with Morgan Stanley & Co.; and Miner H. Warner, vice president and manager, Government Finance Group at Salomon Bros., Inc.

We have submitted our full written statement, and we hope you will admit it into the record, and I will endeavor to summarize it.

Mrs. LLOYD. It's certainly a distinguished panel. We're very delighted that you are with us today, that we can hear from you. So, Mr. Katzin, if you will——

Mr. KATZIN. Going out of order——

Mrs. LLOYD [continuing]. Your complete statement will be made a part of the record, without objection.

Mr. KATZIN. Thank you.

Going out of order, we may have to build more into my statement than I had anticipated because I didn't want to repeat the previous speakers.

But the four investment banking firms were represented on the task force which is responsible for this plan. Our role was limited to financial considerations. We have endeavored to develop an approach to the capital markets which would reduce direct Federal appropriations and outlays, increase private sector participation and, at the same time, avoid any increase in utility rates. It also has to be salable to a highly sophisticated market.

We welcome this opportunity to present our views to you, and we appreciate this invitation. We will endeavor to respond to your questions, and we hope by this presentation to satisfy you that the financing plan responds responsibly and directly to Congress direction, that it is both economic and feasible, that it provides the maximum participation by the private sector which can be achieved, and that the safeguards and assurances requested in the plan are the minimum needed to attract so large amount of capital from private sources.

The economics of the plan, as has been stated before, depend on the future income stream from the sale of electric power from the project. The size of the financing package is set by the revenues reasonably anticipated from commercial operation of the reactor.

To arrive at this revenue figure, a study was made by outside consultants of the probable prices for electric energy and the project's region over its useful life. Based upon various regional studies, a market for that output was also projected, and assumptions were made of probable output from the project.

Together, these provided a measure of the future income stream which would be available to service and repay the private debt, and thereby establish the maximum amount of debt financing which the project could support from forecasted revenues.

The industry contributions from the utility companies, both private and public utilities, constitute private sector participation in the financing of the project. However, these utilities are making R&D contributions and will neither benefit from the Federal Government's safeguards and assurances to be provided to the private debt and equity investors nor share in any investor returns from the project. It is a contribution, not an investment, but it comes from the non-Government sector.

As you've been told, the plan provides for $1 billion of private capital toward the cost of constructing the project or 40 percent of the estimated cost to complete of $2.5 billion. In addition, an estimated $365 million will have to be spent for interest during construction on the debt portion and on financing costs. Thus, the actual amount of private funding will be $1,365 million.

Now one of the members of the committee referred to this financing as discount notes and as though that were some unusual or derogatory form of financing. First, they aren't discount notes, but I should point out that the U.S. Treasury is the largest issuer of discount notes, issuing billions of dollars of them every week as a conventional type of financing.

What we have here is ordinary construction financing. As you borrow money, you have to begin paying interest, and that interest accrues. And since there is no outside income from this project during construction in order to pay interest as it accrues, it has to be prefunded as part of the debt issue. There's no sleight of hand here. It is a straight financing, just as you would do if you were building a house.

The partnership will be capitalized with a billion, $40 million of debt and $150 million of equity. With the addition of the further $175 million to be contributed by the utilities, the total private sector participation thus comes to $1,365 million.

There are several ways for assuring sufficient revenues to service $1,040 million of this debt. We've proposed one method, which is that the Federal Government, acting through the Department of Energy, enter into a power purchase contract to assure the timely payment of the principal of the interest and principal of the debt.

We also propose that any payments by the Department of Energy pursuant to this contract resulting from shortfalls in income be treated as a loan to the project, to be repaid as soon as practicable thereafter from project revenues. Once profitability has been reached and project reliability established, the Government can begin to recoup a portion of its R&D costs from its share of the revenues.

A key component of this financing plan is the equity investment of $150 million. No part of the revenues from electric sales will go to equity investors until the plant reaches a break-even point. The equity will then begin to earn a cash return only if sales of electricity bring in sufficient revenues. These investors will be attracted by tax incentive benefits.

But there must also be a business purpose for the investment. This business purpose would be the earned return from a successful revenue-producing project, and the equity investors would take the risk that earnings might be insufficient after recovering debt service to provide any case return to them.

The plan does not guarantee any cash return to the equity investors. The tax benefits will accrue as contruction progresses. It is not accurate to say that equity will be recovered in the first or even the second year from these tax offsets. In fact, the tax savings will come over a period of time as construction progresses.

The equity will be sold in competition with other similar equity investments in the marketplace. If it turns out that, after all of the agreements and the tax rulings have been obtained, that the return on equity after taxes is more than the market requires, then the project will be in a position to sell additional equity beyond the $150 million. That 150—that additional sales can either be used to reduce the amount of debt, and thereby the Government's backup obligation, or it can be used to increase the total private sector participation. But we will meet the test of the marketplace, and we'll only provide that incentive which the marketplace can get elsewhere if it doesn't invest here.

Now the interest on the proposed debt will be taxable, as will any cash return on equity and any profits realized by the equity investors from the disposition of their investment.

Investors and debt instruments are accustomed to taking a market risk, but they will not take project risks associated with large projects of untried technology. By market risk, we mean the risk of changes in interest rate levels as well as the inflation rate which erode the value of the investments. Experience of the past decade shows these risks to be very real for investors in debt securities. They cannot and, as fiduciaries, they may not invest in an unproven venture. They must have reasonable assurance, enough to satisfy a prudent man, that the project will be completed, that it will operate over the term of the debt, and that there will be revenue flow sufficient to service and repay their loans.

These assurances can come only from the Government, whose R&D project this is, and who has complete control and responsibility for the design, construction, and continued operation of the project. These are similar assurances given investors by the sponsor of any industrial project financing.

With these assurances, which would be contained in the power contract with the DOE, the unique nature of the project finance—for financing purposes will be minimized and the debt securities will be marketable in competition with conventional financings in the private sector capital markets. The Government's contribution to the joint venture plays no role in the marketing of these securities.

We want to emphasize, as the plan clearly states, that no special tax incentives are being requested, the project would be relying on existing law, and would compete in the marketplace without any special tax advantage. It would utilize only existing provisions of existing laws as they are applied by the Internal Revenue Service and which are available to everyone on an equal basis.

Our proposal would not protect the investors—the equity investors against the absence of cash flow or residual value, or is there any assurances that investors will be in a position to utilize the tax benefits as they accrue. These are risks each equity investor will be expected to take.

Madam Chairman, this is a summary of the plan and of an abbreviated justification as to how we arrived at it. We appreciate your interest and attention. The other investment bankers are here, and we are all prepared to respond to your questions.

[The prepared statement of Mr. Katzin follows:]

STATEMENT

OF

JEROME S. KATZIN
MANAGING DIRECTOR, LEHMAN BROTHERS
KUHN LOEB INCORPORATED

BEFORE

THE

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
U.S. HOUSE OF REPRESENTATIVES

SEPTEMBER 15, 1983

Introduction

My name is Jerome S. Katzin. I am a Managing Director of the investment banking firm of Lehman Brothers Kuhn Loeb Incorporated of New York. With me forming the panel which will respond to your questions are Frederick S. Potter, Vice President, Merrill Lynch Capital Markets, John W. Barr, Principal, Morgan Stanley & Co. Incorporated, and Miner H. Warner, Vice President and Manager, Government Finance Group, Salomon Brothers Inc. We are submitting this statement for inclusion in the record of these proceedings. I will give a summary of its contents.

By way of introduction, I have been with my firm and its predecessor, Kuhn Loeb & Co., for 30 years. Prior to that I was with the Securities and Exchange Commission, which I joined upon graduating from law school in 1941, holding various staff positions, including Director of its then Division of Public Utilities. I am presently Financial Advisor to the National Rural Utilities Cooperative Finance Corporation, to the Platte River Power Authority and to the Coastal Corporation. I have in the past served as advisor to the Bonneville Power Administration, to the Sacramento Municipal Utility District, and to other public entities. I am a Director of Atlas Corporation, a major producer of uranium oxide, of Volt Information Sciences

Inc., and an Advisory Director of Northville Industries, a transporter, distributor, and warehouser of oil and oil products.

In order to assist the Breeder Reactor Corporation prepare an alternative financing plan for the Clinch River Project, four major investment banking firms helped to develop an approach to the capital markets which would reduce direct Federal government appropriations and outlays for the project and increase private sector participation. Representatives of Lehman Brothers Kuhn Loeb Incorporated, Morgan Stanley & Co. Incorporated, Merrill Lynch Capital Markets, and Salomon Brothers Inc. took an active role in the deliberations and planning of the Task Force, as they related to financial considerations. The plan which has been presented to you is in response to the 1982 Congressional mandate which directed the Department of Energy "to vigorously explore proposals including a reconsideration of the original cost-sharing arrangement, that would reduce Federal budget requirements for the Clinch River project. . .and secure greater participation from the private sector."

The banking group welcomes this opportunity to present its views to this committee and we appreciate the invitation which you have extended to us. We will endeavor to respond to your questions and we hope by this presentation to satisfy you that the financing plan is workable, that this participation by the private sector is the maximum which can be achieved, and that the safeguards and assurances requested in the plan are the minimum needed to bring in the large amount of anticipated private capital.

Determining Economic Value

The following considerations were taken into account in the development of the financing plan:

1. The 1982 Congressional mandate which directed the Department of Energy "to vigorously explore proposals including a reconsideration of the original cost-sharing arrangement, that would reduce Federal budget requirements for the Clinch River project ... and secure greater participation from the private sector";
2. The fact that substantial Federal funding would be required because the projections of net revenues from the sale of the electricity produced by the project were inadequate to support private sector debt financing in excess of $1 billion; and
3. The fact that the project was fundamentally a research and development effort and that, without appropriate undertakings from the Federal government, private financing would not be available for the project.

The plan involves complex tax, regulatory, legal, and credit support issues. A favorable resolution of these issues will be a prerequisite for its success.

The economics of the plan depend to a large extent on the capitalization of the future income stream from the sale of electric power from the project. That future income stream has a present value which we believe can be financed in the market place, provided that certain Federal government assurances are available. A study was made by outside consultants of the probable prices for electric energy in the project's region over its useful life. Assumptions were made of the probable output of the project. Based upon various regional studies, a market for that output was also projected. Together, these provided a measure of the future income stream which would be available to service and repay the private debt, and thereby established the maximum amount of debt financing which the project could support from forecasted revenues.

The figures are contained in the plan before you. Of course, a number of assumptions have to be made in a projection of this sort. Mr. Corey in his testimony explains the basis for the assumptions used. Among the major ones, on which opinions may differ and events may change, are:

1. The level of output from the plant (load factor);
2. The future market price for the output;

3. Operating expenses; and
4. The cost of debt capital.

Form of Organization

Our plan recommends a joint venture arrangement rather than a joint public-private corporation such as Comsat. In this way the capital market financing will not be made through a government or quasi-government agency.

The private portion of the joint venture would be a partnership of private investors in order to pass through to such investors the direct tax incentives which will be utilized to attract equity capital into the project. As is often the case in project financings, it is contemplated that construction would be financed by equity contributions and bank loans, with the loans funded long term either in segments from time to time or completely when the project is finished and operating.

The $175,000,000 research and development contributions by the participating utilities would be made in accordance with the original planning, and are in addition to the $150,000,000 which the utilities have already contributed for such purpose and for which no return is to be paid. These R&D contributions constitute private sector participation in financing the project. However, utilities making the R&D contributions will neither benefit from the Federal government safeguards and assurances to be provided to the private debt and equity investors, nor share in any investor returns from the project.

In the opinion of representatives of the utility industry on the Task Force, the utility industry could not be called on for additional financing. The reason for this is that the entire atmosphere of utility rates and rate regulation has changed since the original commitment was made. Neither state regulators, who would have to authorize rate increases to pay any additional contribution, nor shareholders, whose returns are already depressed, seem likely to approve further funding. Presently, when utility rates have a high profile and rate increases encounter great public resistance, utility commissions are unlikely to authorize contributions for any such long term large-scale development projects at consumer expense.

In fact, under these circumstances, the utilities' willingness to stand by their original commitment, despite a severe deterioration in the financial condition of the industry, provided that the government will fulfill its own commitment to complete the project, is evidence of their good faith and of their support for the need for this technology.

Cost and Sources of Capital

The plan provides for $1 billion of private capital toward the cost of constructing the project, or 40% of the estimated cost to complete of $2.5 billion. In addition, an estimated $365,000,000 will have to be spent for interest during construction on the debt portion and on financing costs: thus, the actual amount of private funding will be $1,365,000,000. The partnership will be capitalized with $1,040,000,000 of debt and $150,000,000 of equity. With the addition of the further $175,000,000 to be contributed by the utilities, the total private sector participation comes to $1,365,000,000.

Accordingly, the revenues will have to support $1,040,000,000 of debt. The plan envisions a debt maturity of 30 years, and for planning purposes we utilize level debt service commencing with the date of operation.

There are several ways for assuring sufficient revenues to service this debt. One method we propose is that the Federal government, acting through the Department of Energy, enter into a power purchase contract to assure the timely payment of the principal of and the interest on the private debt. We also propose that any payments by the Department of Energy, pursuant to this contract, resulting from shortfalls, if any, in net revenues from resale of the power into the market, be treated as a loan to the project, to be repaid as soon as practicable thereafter from project revenues. Once profitability has been reached and project reliability established, it should be possible for the government to begin to recoup part of its R&D costs from its share of the revenues of the joint venture and from its interest in the residual value of the plant after the debt has been amortized.

A key component of this financing plan is the equity investment of $150,000,000. No part of the revenues from electric sales will go to equity investors until the plant reaches the break-even point. The equity would then begin to earn a cash return only if the sales of electricity bring in sufficient revenues. The equity investors would also have a share in the post-amortization residual value. These investors will be attracted by tax incentive benefits but there must also be a business purpose for the investment. This business purpose would be the earned return from a successful, revenue-producing project and the equity investors would take the risk that earnings might be insufficient, after covering debt service, to provide any cash return to them. The plan does not guarantee any cash return to the equity investors. That is a risk they will be expected to take. We are recommending that any revenues remaining after the payment of operating expenses and debt service and residual value be shared by the equity investors and the government based on the ratio of the total private investment to the total cost of the plant. It should be noted, in any case, that the profit potential, if any, would be limited since the sales price of the output will be set by the competitive cost of alternative energy in the area.

The debt instruments will have a senior lien on the revenues of the project after operating costs. In order to broaden marketability of this debt, the objective will be to make its terms as conventional as possible. The debt may be sold publicly if the plant is operating and if there is a good public market at the time. On the other hand, the debt might be placed directly with institutional investors if a lower cost of money or better terms can be obtained or if other conditions warrant. We obviously need to have the flexibility to adjust to market conditions, which will dictate the maturity of the debt, the security provisions required, the interest rate, other terms and conditions and the timing of sales to take advantage of market conditions.

Raising over $1 billion of debt is a sizeable task. It is essential to design a debt instrument with the broadest appeal, not only to institutions which are the major purchasers of debt, but also to individuals if a public offering can be made. We have no doubt whatsoever, given the enactment of the proposed legislation, the negotiation of a satisfactory power contract with the Department of Energy, and suitable terms on the debt instruments themselves, that it will be possible to raise $1 billion from the markets on highly satisfactory terms.

The interest on this debt would be taxable, as would any cash return on equity and any profits realized by the equity investors from the disposition of their investment.

Investors in debt instruments are accustomed to taking a market risk, but they will not take project risks associated with large projects of untried technology. By "market risk" we mean the risk of changes in interest rate levels, as well as the inflation rate, which erode the value of investments. The experience of the past decade shows these risks to be very real.

By "project risks," we mean risks such as, but not limited to, the failure of a new technology to operate as designed, the subsequent obsolescence of a new technology, or the failure of a project to continue to operate for its expected life. Investors will not, and those who are fiduciaries may not, knowingly invest in an unproven venture. They must have reasonable assurance, enough to satisfy a prudent man, that the project will be completed and that it will operate over the term of the debt so that there will be a revenue flow to service and repay their loans. In order to attract these investors, the following basic assurances are required:

1. That the project will be completed and that it will operate and produce sufficient net revenues to service and repay the debt;

2. That it will be licensed to operate and will be allowed to operate during the term of the debt; and

3. That should there be any change in government policy which results in the project being terminated before completion, or abandoned after completion, failed to be licensed, closed down, or otherwise rendered inoperable, this would be viewed as a property-taking by the government and the outstanding principal amount of the debt would be accelerated and repaid.

With these assurances, which would be contained in the power contract with the DOE, the unique nature of the project for financing purposes will be minimized and the debt securities will be marketable in competition with conventional financings in the private sector capital markets.

The CRBR will undergo the normal review and approvals by the Nuclear Regulatory Commission at the appropriate stages of the licensing process. The financing plan does not seek any Congressional waiver of licensing requirements.

Turning to the equity component, we do not believe that the equity can be sold as a new issue of common stock in the public market. There is no likelihood of significant future profits for the equity investor such as those which spur interest in the securities of new technology companies today. This will be a single, finite project with little prospect for growth or even of a proprietary right to inventions made in the course of the project. Return on equity will be constrained by, among other factors, the cost of alternative energy in the service area. Moreover, the equity investor would have to undergo the risk of long years of construction before he could begin to expect any operating profits to accrue and, even then, profits would be uncertain. The CRBR Project has an unfortunate history of governmental vacillation, controversy, and uncertainty. Thus, a public stock offering to provide the initial equity investment is out of the question.

The tax benefits available under existing tax law, however, provide an incentive for certain investors to commit equity to the project. Some of the tax benefits from the project would begin to be realized almost immediately. The major tax benefit would be the investment tax credit. It is also likely that interest during construction will be deductible on a current basis, although this might have to be capitalized and depreciated commencing with the date of operation. The important benefit of accelerated depreciation would be deferred until commercial operation a number of years from now, which would reduce the present value of these deductions to the equity investors. This deferral reduces the attractiveness of this project to potential equity investors, particularly since most equity investors are not accustomed to committing funds so far in advance of commercial operation and, hence, usually have the accelerated depreciation deduction more immediately available.

An IRS ruling covering the application of existing Federal tax law to the facts of the financing plan will be required prior to equity investors actually advancing funds.

We want to emphasize, as the plan clearly states, that no special tax incentives are being requested. The project would be relying on existing law and would compete in the market place without any special tax advantage.

It would utilize only existing provisions of existing law, as they are applied by the Internal Revenue Service and which are available to everyone on an equal basis.

The rate of return to an equity investor in the project will come from the tax benefits anticipated to be available under current Federal tax law, cash flow from operations, and residual value. Due to the uncertainty of the timing and magnitude of cash flow and residual value, these equity investors will be looking towards the anticipated tax benefits to provide the minimum required rate of return of their equity investment. Therefore, in addition to the IRS ruling covering the availability of the anticipated Federal income tax benefits, the following assurances will be required to successfully market the equity:

1. Indemnification against changes in Federal tax law and regulations, subsequent to the equity commitment by the investors and prior to the commercial operation of the project; and
2. Indemnification against the failure to complete or operate the project, which would assure to equity investors the return of their outstanding investment, net of adverse Federal income tax consequences.

Our proposal would not protect the equity investors against the loss of cash flow or residual value.

There is, however, one change in existing law needed to market the equity. The equity partners will have to be given exemption from the Public Utility Holding Company Act of 1935 ("PUHCA") if they would otherwise become subject to the Act by reason of their purchase of equity in the partnership. It was certainly not the intention of the PUHCA to make registered holding companies of investors in a single project of this sort, when they are otherwise not engaging in any of the activities that the Act seeks to regulate. In our opinion, the risk of regulation under the PUHCA of 1935 would inhibit otherwise willing equity investors from participating in the project.

Thank you for your interest and attention. The other investment bankers here and I are prepared to respond to any questions you might have on the financial plan for the project.

Mrs. LLOYD. Thank you very much, Mr. Katzin. I believe you've answered questions that have been basically asked this morning from the investment side. They certainly are very pertinent questions.

I think we will proceed with the remainder of the panel at this time, then all of you, all eight of you then, will be questioned, if that's agreeable.

Our next panel is Mr. Gordon Corey, who is chairman of the breeder reactor corporation task force. Mr. Corey is accompanied by Mr. Frederick Hickman, Mr. Hendrick Houthakker and Dr. Richard Hellman.

Welcome, gentlemen, to our hearings today. We look forward to hearing from you.

We do have your complete testimony. Mr. Corey, you may proceed as you wish. You may summarize. But, without objection, your entire statement will be made a part of the record.

STATEMENTS OF GORDON COREY, CHAIRMAN, BREEDER REACTOR CORPORATION TASK FORCE; FREDERICK HICKMAN, HOPKINS & SUTTER; HENDRICK HOUTHAKKER, PROFESSOR OF ECONOMICS, HARVARD UNIVERSITY; AND RICHARD HELLMAN, PROFESSOR OF ECONOMICS, UNIVERSITY OF RHODE ISLAND

Mr. **Corey**. Thank you very much. I appreciate being invited to join you all here, and especially beyond—in this room on the same day with Secretary Hodel, who did such a marvelous job of explaining our plan.

Mrs. **Lloyd**. And both very distinguished gentlemen, and you've played a very important role in our hearings.

Mr. **Corey**. Thank you.

Our plan——

Mrs. **Lloyd**. Pardon me. Would you—I think you need to be a little bit closer to your microphone.

Mr. **Corey**. Our plan—thank you—our plan provides—maybe somebody would choose just as soon not to hear me anyway.

Our plan provides for raising $1.365 billion in private funds, $1.2 billion of new money, and $175 million of R&D funds already pledged by the utility industry.

And I should mention, several times through this morning comments have been made about the utility industry as though, somehow, they were going to be the investors or the—or the equity owners of this project. It is not contemplated under our plan that the project will be—will be financed any further by the utility industry, which is hard pressed for financing these days. But the revenue bonds and the equity participations will be sold in the general capital markets.

In response to Congressman Roe's query, we do expect the project to operate longer than 30 years, and we do expect it to provide significnat residual values. We believe Congress is getting just what it asked for, an actual reduction in Federal expenditures, not just a rearrangement of the Federal financing role.

In answer to Mr. Lundine's query of Secretary Hodel, the Treasury letter that was signed by Secretary Chapoton yesterday does not indicate that there is merely a wash to the Treasury under our plan, but it indicates a gain.

Let me read question 3 from the letter and the answer thereto. Question: "Assuming operating costs are equal, but that the private owners would, as described, invest an amount which reflects the expectation that they sell the output for more than could the Government, is there a gain or a loss to the Government?"

Answer: "There would be a gain to the Government. Consumers would be covering costs and the price which the Government would otherwise have to cover in expenditures."

That's the end of the quote from the—from the Treasury letter.

My testimony makes it clear that we expect net revenues available for debt service under our plan to be $75 million a year greater than they would be under present arrangements. Thus, the answer to question 3 is a valid answer with respect to our plan. We do anticipate that the revenues will be greater under our plan, and Treasury, therefore, would expect a net gain to result to the Treasury.

My testimony makes it clear on this. And I might say that the $75 million is a comparison of what we expect revenues available for debt service of $110 million to be compared with only $35 million of the output of the project were sold to the Tennessee Valley Authority under present arrangements.

Now let me take just 2 minutes to summarize my prepared testimony. I had made just seven points.

One, we expect to raise nearly $1.4 billion by capitalizing on the commercial value of the project; two, we expect to get a larger project output and sell it for $75 million a year more, and under existing arrangements; three, there is no tax ripoff in our plan, the U.S. Treasury will show a gain, not a loss; four, the assurances required are needed because the project is being managed by the Government and it is within the Government's power to alter or cancel the project or to destroy its liability. But there is no intent to alter the nuclear licensing process in any way, and the Government's risk is not increased by these assurances, they merely substitute a contingent liability for a direct appropriation.

It's almost as though if I were to offer my son $100 as to buy something he wanted, and he said, "No, Dad, I think I can raise it. But if I can't, maybe I'll come back and ask for the hundred." I don't think, under those circumstances, anyone would say that I had increased my risk.

Five, excess revenues beyond those needed to cover debt service will be available to retire debt early and, thus, extinguish the Government's contingent liabilities, or to provide direct payments to the U.S. Treasury or both.

Six—and this is in answer to Congressman Lowery's and Brown's queries about risk—private equity investors are assuming significant risks in addition to the normal market risks. They may not be able to utilize the tax benefits when they become available. The value of those benefits will be significantly reduced if their realization is delayed by project construction delay or for some other purpose. In a special project like this, there are almost bound to be uncertainties as to what tax consequences have been assumed, despite preliminary rulings. Inflation may reduce the value of future tax deductions and credits. If the project is prematurely terminated, there may be a significant loss of value to the equity holders if the compensation for tax recapture is inadequate. And, finally, any payment made for residual values will always be fully at risk.

All of those risks are in addition to normal market risks which will be assumed by the equity holders.

My seventh point in my testimony was that we have made contingency plans, we have reviewed possibilities, uncertainties. We believe the—there is far more likelihood to have earnings in excess of those needed than to cover debt—to cover debt service and vice versa.

This completes my summary. I'd like to make just one or two quick points.

The first one, in case I'm running out of time, is that in answer to the ubiquitous——

Mrs. Lloyd. You have 3 minutes.

Mr. Corey. OK. Thank you.

Mrs. Lloyd. There is no hurry.

Mr. COREY. In answer to ubiquitous inquiries this morning about the evils of conventional tax provisions which this Congress has provided to equity owners of all large construction projects, in answer to that, we assume that these conventional benefits will be available to this project. But if the Congress chose to penalize this project, compared with all other private projects, this would not be fatal to our plan. We can finance using additional revenue bonds and little or no equity, if that's what the Congress wishes.

The consequences will be to minimize the likelihood that the bonds will be paid off early and, thus, that the—the Government's liabilities, contingent liabilities, will be extinguished early.

Another point or two. Under our plan, the project can be completed and its full R&D potential realized at a net cost to the Government of only about $1 billion spread over 7 years. This seems a small price to pay to keep our Nation in the forefront of nuclear power technology.

The billion dollars represents the billion and a half remaining appropriation, less at least a half a billion dollars of cancellation costs, including the secondary effects of cancellation upon general business activity and employment.

A third and last point is that nuclear power is environmentally sound and economical. To quote Dr. Houthakker, The Energy Journal, April 1983, "From a strictly environmental point of view, nuclear generation compares favorably with generation from fossil fuels, especially coal. In most other countries, nuclear power is still doing well."

Last year at Commonwealth Edison—and maybe Jim O'Connor will say something about this—but last year, we generated 25½ billion kilowatt hours, 40 percent of our output, with nuclear. This is equivalent to about 80 percent of the entire output of Consolidated Edison Co. of New York.

These nuclear kilowatt hours were generated at a busbar cost of 2.3 cents per kilowatt hour, including carrying charges on the entire net investment. They compare with 4.3 cents for power from Commonwealth's coal-fired units, a saving of 2 cents or $500 million last year.

Thank you.

[The prepared statement of Mr. Corey follows:]

STATEMENT

OF

GORDON R. COREY
Financial Consultant and
Retired Vice Chairman of
Commonwealth Edison Company

BEFORE

THE

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
U.S. HOUSE OF REPRESENTATIVES

SEPTEMBER 15, 1983

STATEMENT OF GORDON R. COREY - September 15, 1983

My name is Gordon R. Corey. I live at 2511 Park Place, Evanston, Illinois 60201.

I am a financial consultant. I am also a director and member of the executive and finance committees of the board of directors, Commonwealth Edison Company, by which I was employed for forty years prior to my retirement on October 1, 1979; a director, member of the directors' audit committee and chairman of the nominating committee of Inland Steel Company; a director and chairman of the finance committee of Perkins & Will, Inc., an architectural firm; and a director of NUKEM, Inc., a nuclear fuel supply, service and brokerage firm. Until early last year, I was also a director and chairman of the directors' audit committees of the Continental Illinois Corporation and the Continental Illinois National Bank and Trust Company of Chicago.

I am chairing the BRC task force to develop plans for private funding of the Clinch River Breeder Reactor Project. In connection with that work, I am also serving as President of American Energy Development Corporation, an entity formed to assist in the financing, construction and operation of the Clinch River Breeder Reactor Project.

I. BACKGROUND

On December 20, 1982, Congressional Conferees approved fiscal year 1983 funding for the Clinch River Project requiring the U.S. Department of Energy "to vigorously explore proposals, including a reconsideration of the original cost-sharing arrangement, that would reduce Federal budget requirements for the Clinch River project or project alternative, and secure greater participation from the private sector."* The DOE was directed to submit its findings to the cognizant Congressional committees not later than March 15, 1983.

In view of the action of the Conferees, a Task Force established by the Breeder Reactor Corporation (BRC) prepared a report, exploring possible project financing proposals. This report, dated March 12, 1983, was submitted to the cognizant Congressional Committees by the Secretary of Energy on March 15, 1983.

On June 23, 1983, the Task Force prepared a second, more detailed report which was submitted by BRC to the Secretary of Energy on June 29, 1983. This report was in turn submitted to the cognizant Congressional committees on August 1, 1983. It responded to requests for specific details regarding the financing plan.

Our second report sets forth a specific proposal ("the Plan") for raising $1 billion in the private capital markets. The Plan was prepared by the Task Force, including the four investment bankers who are members of the Task

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* H.R. Rep. No. 980, 97th Cong., 2d Sess. 186 (1982).

Force. We believe Congress is getting just what it asked for in that proposal, which provides $1 billion that will never have to be paid by the Federal government, if it constructs and manages the Project as anticipated. Indeed, the Plan will result in an actual reduction in Federal expenditures, not just a "rearrangement" of the Federal financing role.

II. THE FINANCING PLAN

The details of the private financing plan, which provides a net of $1 billion towards the direct cost of constructing the Project, are set forth in our June 29 report which has already been made available to this Committee.

In considering these details, one should always keep in mind that the Plan is a judgment, based on the cumulative experience of Task Force members, as to the approximate amount investors in the open marketplace should be willing to pay for certain saleable assets in the total breeder reactor complex, providing those assets are packaged for sale in the optimum manner. It is an investment banking planning document, not an analysis of a completed transaction. Figures are forecasts and approximations. Individual figures within the total plan may turn out ultimately to be different, although particular changes are often offset by contra changes in other items. (See, for example, the discussions of interest rates in Section G below.) No one can look even ten years into the future without encountering major uncertainties. The Task Force believes, however, that its estimates and approximations are conservative, in the sense that they contain adequate allowances for uncertainties. It is comfortable with its conclusions, provided it is understood that it is dealing in approximations of what the marketplace will ultimately do.

As indicated in the financing illustration shown in that report, total private financing of approximately $1.365 billion will be raised, on the assumptions shown. The $1 billion figure breaks down as follows:

	Millions
Proceeds of 30-year bonds issued in 1990	$1,040
New equity participations	150
R&D funds already committed by utilities and others, including interest (in addition to about $150 million already paid in)	175
Total private financing	$1,365

Of this amount, $1 billion will be available to pay direct construction costs. The remainder will be used for interest during construction and financing costs.

The June 29 report provides many details regarding the Plan and the procedures for implementing it. My testimony and that of the investment bankers represented here today will provide further details. Finally, there will be additional details which can be worked out only as the financing documents are developed and the securities are marketed.

Based upon my experience of approximately 20 years as Chief Financial Officer and later Vice Chairman of Commonwealth Edison Company, I believe that we have developed a viable plan which will produce significant financial support for the Project.

Our first financing move will be to establish lines of credit for construction funds to be taken down as required to facilitate optimum construction scheduling.

These funds will be repaid, together with accumulated interest, from proceeds of the sale of bonds from time to time during the construction period or after the Project is finished and operating.

We plan to obtain new equity funds through the sale of equity participations as soon as practicable after approval of the Plan.

Funds already committed by utilities and others will be drawn down as required.

Outline of My Proposed Testimony

Our financing proposal has been described in detail in the two Task Force reports, especially the June 29 report. Testimony submitted by Jerome Katzin on behalf of the four investment banking firms provides further details as to how the money would be raised. It is not my intention to duplicate Mr. Katzin's testimony, but to deal with other matters, including how our proposal would be implemented. Hence, it is my intention to deal herein with revenues, contingencies, tax implications, risks, warranties, and other matters relating to the overall consequences of the proposal, as follows:

A. The Issue and the Problem
B. Revenues and Incentives
C. Taxes: Revenue Impact
D. Assurances
E. Residual Value
F. Risks
G. Contingency Plans

The remainder of the testimony will be organized under these seven headings.

A. THE ISSUE AND THE PROBLEM

The issue is whether the government should abandon a major research and development project relating to nuclear fission. The Project was undertaken 12 years ago and it was intended to keep the U.S. in the lead of nuclear technology. One-and-a-half billion dollars have already been spent on it and an additional several hundred million dollars of cancellation costs and secondary detriments would be incurred if it were abandoned.

A primary purpose of this research and development effort is to take breeder technology for the production of nuclear energy (in the form of heat)--proven technology from three decades of experimental operations--and adapt it to the commercial generation of electrical power. Part of the Project installation will consist of electrical generating facilities (turbines, switchyards, distribution lines, etc.) which are more or less conventional in design. The Project will, when operative, produce electricity for sale to customers.

There are two distinct aspects to the Project: the research and development aspect, which is the primary purpose of the Project, and the commercial power production aspect, which is a byproduct of the research and development effort. The by-production of power will generate revenues that will cause a part of the total Project to "pay for itself."

Under the Plan, approximately $1 billion will "pay for itself." That much will be paid "up front" by private investors. Under previous arrangements, a part of the Project would, in effect, have been "paid for" gradually by revenues (less expenses) generated over the life of the plant. The estimated revenues generated under the old arrangements would have been sufficient to pay for approximately $400 million of the government's investment over a

30-year period. The greater payoff under the Plan comes about because of higher prices for output and greater operating efficiencies.

Research and development.

Under the Plan, the government would continue to fund the research and development effort and would appropriate now the government funds to be disbursed over the next seven years. Immediate appropriation is required so that the parties concerned can proceed in confidence that the Project will be completed and can provide, through private borrowing, supplemental funds adequate to permit optimum construction scheduling.

The electric utility industry and project contractors have committed to contribute $325 million (including interest) to the research and development effort, in the belief that the technology will ultimately benefit electric consumers (as distinguished from stockholders). One hundred fifty million dollars of that amount have been contributed and the remaining $175 million will be contributed only if certain conditions contained in those commitments are satisfied. (If the government abandons its further funding, the utilities will do likewise.)

The utility group of R&D contributors neither has nor expects to have any ownership interest in the Project, or in any of its revenues.

The payoff for the research and development effort must come in the form of advanced technology, which will benefit both the nation as a whole and future consumers of electricity in particular.

Power generation

Under the Plan, the power generation aspect of the Project incidental to the research and development aspect would, in effect, be sold in the open marketplace to private investors (not to utilities, nor to the utility group).

The price at which any productive facility can be sold in the open marketplace depends entirely upon the amount of revenues the facility can be expected to generate and upon the amount of the expenses, including taxes, which must be funded out of those revenues. The principal work of the Task Force was to bring together the electric industry, the investment banking community, and the financial, tax, and legal expertise required to examine the potential revenues and expenses and to determine how the sale of the power generation aspect could best be structured to bring the maximum price in the open marketplace.

The Plan concludes that the power generation aspect can be sold for approximately $1 billion if the transaction is structured as recommended. That represents about 40% of the Project's remaining cost. What would be sold is the productive capacity, its revenues and attendant expenses. If the revenues are sold, they will not, of course, accrue to the government, except for possible excess earnings after the bonds have been paid off.

The sale price

The sale price obtainable for the power generation aspect depends, obviously, upon what is being sold. The more being sold and the fewer the risks to the purchasers, the greater the price obtainable.

As the Plan assumes the sale in the open marketplace, one can assume that it will be a "fair" price.*

The package proposed to be sold is, in the judgment of the Task Force, the optimum package to command the best price in order to achieve the maximum reduction in the amount of Federal funding required to complete the project.

Public v. private ownership

In assessing the Plan, the real issue to be addressed is whether it is preferable for the government to sell the productive capacity aspect to private investors or to keep it for the government. That will depend in part on the price obtainable from private investors for the power generation aspect and in part on the value of the productive capacity if kept by the government, a matter which is discussed in Section B below.

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* It is, of course, true that a fair price may, in retrospect, appear to have been disadvantageous to one party or the other, depending on how original uncertainties subsequently turn out. But since neither party knows in advance how the uncertainties will be resolved, the open marketplace remains the final arbiter for fair market values.

B. REVENUES AND INCENTIVES

The power output of the Project will be worth more if marketed by the private sector as provided in the Plan than if marketed by the government under the existing arrangement, because the revenue stream will be larger.

This is true for two reasons:

(i) Higher electricity price if owned by the private sector

A key part of the Plan is to recommend a basic change in the way the power output is marketed. This recommendation is based upon the judgment of Task Force members that the power can be sold, and more profitably, under alternative arrangements. The change recommended could be made alone, without other elements of the Plan, albeit with difficulty, but the aspects of the Plan dealing with private participation make the change easy and natural.

Under current arrangements the government would retain the power generation aspect and the power would be sold to the TVA for use on its system at prices at or below what it would cost the TVA to produce such power (the TVA's "avoided cost"). In that event, the price of power in 1996 (five years after startup) would be in the range of 7¢ to 8-1/2¢ per kwh, or possibly lower.*

Under the Plan, the power would be sold to private utilities at a price at or near what the utilities would otherwise have to pay for such power, viz., their "avoided cost." Because of differences in the character of the systems, the avoided costs of private utilities in the Southeast are generally higher than those of the TVA. Thus, under the Plan, the power will be sold to systems where it has the highest replacement value, rather than to the TVA, which has among the lowest costs. The predicted price for power sold to such private utilities in 1996 is 11¢ per kwh.**

The gross revenues generated will accordingly be substantially greater under the Plan. These greater revenues will be obtained without increasing charges to any electric customers because, under the Plan, Clinch River power will never be sold for more than what the power it replaces would have cost. However, if sold privately, the Clinch River power will generally displace power generated with oil while, if marketed in the TVA area, it will displace power generated with coal.

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* Based upon predictions of TVA's avoided energy cost made by the S. M. Stoller Corporation for Project Management Corporation, March 18, 1983, Table 2-1. These predictions are based on TVA input (see p. 2-3).

** Based upon the Stoller report, id. See Subsection (c), below.

In either case, it is estimated by the BRC Task Force that the Project's fuel, other operation and maintenance expenses will approximate 5-1/2¢ per kwh in the mid-1990s and that the Project will, on average, produce about two billion kwh per year (65% capacity factor). Thus, under the old plan, there would be no more than 1-1/2¢ to 3¢ per kwh available to the government to cover its debt service, and possibly less on an annual basis, round-the-clock. The net annual revenues available for debt service under the old plan would be expected to approximate $40 million to $50 million (two billion kwh at 2¢ or 2-1/2¢ per kwh, the middle of the above range).

By contrast, the Plan is expected to provide net revenues of at least 5-1/2¢ per kwh in the mid-1990s and thereafter, on an annual basis round-the-clock, equivalent to $110 million a year available for debt service on private debt.

(a) Why sale to the TVA?

Under current arrangements, the Tennessee Valley Authority has first claim on Clinch River power. Whether or not the preference clause would apply directly to that power, its long-standing application to power sales from most Federal projects makes it highly unlikely that the TVA (or DOE, if it were to retain sole ownership and financing responsibility) would be willing or able to distribute that power to private utilities outside TVA's service area over the objections of municipal customers. Nor does it seem likely that the Congress would look kindly on such an action. Moreover, it is not clear that the TVA could legally pay more than its avoided cost for Clinch River power, if for some reason it were inclined to do so--a question which could probably be settled only by litigation.

(b) Will there be a need for Clinch River power?

Much has been said of the possible lack of need for Project power, based in part on testimony of William Willis of the TVA.* But we do not anticipate the sale of Project power to the TVA. So long as oil is being used to generate electricity in the southeast region of the U.S., there should be an adequate market for Project power. After all, the Project represents far less than 1% of the installed capability of the Southeastern Electric Reliability Council ("SERC") region.

(c) How sure is the 11¢ per kwh estimate?

As stated earlier, the 11¢ per kwh revenue estimate was derived from estimated avoided cost data provided in a report prepared by The S. M. Stoller Corporation (SMS) and submitted to Project Management Corporation on March 18, 1983.

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* 129 Cong. Rec. S. 11185 (daily ed. July 29, 1983).

For 1991, immediately after scheduled completion of the CRBR Project, four major utility systems surveyed by SMS reported estimates of avoided energy costs averaging 11.7¢ per kwh. By 1996, the overall average for all utilities surveyed outside the TVA system had grown to well over 11¢ per kwh.*

The SMS projections were arrived at after comprehensive surveys of investor-owned utilities surrounding the TVA area.

In making the Task Force projections of future CRBR revenues, we have used a flat figure of 11¢ per kwh, thus ignoring all inflation after 1996.

Therefore, we believe our 11¢ per kwh revenue assumption is attainable and conservatively low.

(ii) Greater output and more efficient operation if owned in the private sector

Our June 29 report makes clear that the Plan, coupled with a one-time multi-year appropriation, will minimize construction costs by insuring against delays from lack of funding and enabling flexible draw-down of private funds so as to permit optimum construction scheduling.

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* The predicted average avoided cost in 1996 for all non-TVA utilities surveyed by S.M. Stoller Corporation is 13.4¢ per kwh (peak) and 10.7¢ per kwh (annual average), for a conservative estimate of 11¢ per kwh, net of wheeling charges, assuming a modest capability to favor peak period operation of the Project's generating capacity.

It also points out that once the Project has been placed in service, the financing obligations contemplated by the Plan will provide strong incentives to operate the Project in such a way that the debt service and other financial requirements will be met consistently. The Project will be managed solely by the government and its managers will have compelling reasons to operate the Project in the most efficient manner possible. Because they will have specific financial targets, they will seek to avoid jeopardizing net revenues and, thus, being put on the spot for triggering the DOE's obligations to private investors--obligations which induced the investors to back the Project in the first place. All this will enhance the possibility of providing significant residual values for the Treasury.

The foregoing incentives (coupled with a multi-year appropriation) are of major significance. Without them, there will be constant temptation for the Government to change course -- to delay appropriations, defer completion, vary construction and operating plans, interrupt output, and generally adopt practices which would increase costs and reduce net revenues. With such incentives, the Project can be operated in a manner which will maximize the amount of private financing and at the same time preserve its R&D character.

It is clear that the foregoing incentives which are inherent in the Plan will, when coupled with a one-time, multi-year appropriation, minimize construction costs and maximize revenues. In my opinion, based upon nearly 40 years of management experience at Commonwealth Edison Company, these factors will significantly reduce construction costs and enhance future output and revenues.

Higher construction costs.

My estimate of an increase in construction costs, without the multi-year appropriation and the efficiency incentives, is based upon my belief that in their absence it would be almost impossible to complete the Project on schedule. Every year would see a new attempt to delay or reduce appropriations and defer construction. There has already been an eight-year delay, due primarily to government actions or inactions. These delays have cost the government dearly in adding to the cost of the Project.

Reduced revenues.

Under the existing arrangements, without the system of incentives inherent in the Plan, the power output of the Project would be unlikely to exceed 1.6 billion kwh per year for the following reasons:

(1) If the Project were not financed in large part through bonds, which can only be repaid by Project revenues if there is a serious attempt to maximize commercial output, there would be a strong temptation to change

course frequently, to alter fuel cycles, to cater to pet projects of this or that faction in the government, and to become lax in the day-to-day operation of the facility. This would almost be inevitable if there were no direct obligation to produce power and maximize revenues.

(2) If the power were sold to the TVA at prices only moderately greater than the out-of-pocket cost of producing that power, those at Clinch River would know it and could be tempted to downplay the urgency of achieving increased output because of the relatively small resulting increment of net income.

As a result, the estimated annual revenues available for debt service could (under full Federal funding) amount to only $35 million, as a rough average, compared with $110 million under the Plan--a reduction of $75 million a year.

C. TAXES: REVENUE IMPACT

Income from assets owned in the private sector is subject to Federal income tax. In computing that tax, gross income is reduced by the deduction of costs (so that only the net income is taxed), and the tax is further reduced by the investment tax credit (ITC). Under present law, the timing (as distinguished from the amount) of the deductions for depreciation together with the investment tax credit provide offsets or "benefits" that significantly reduce the real burden of the income tax below the rates formally prescribed in the Internal Revenue Code.

Moving a portion of the Project from the public sector to the private sector, as the Plan proposes, makes income from that portion of the assets taxable, and at the same time, eligible for "tax benefits" that reduce taxes. It thus raises the question of whether the combination of taxes and tax benefits somehow "costs" the Government more than if the assets were continued to be owned in the Government sector.

The short answer is no. The answer would be different if other than conventional tax "benefits" were involved. But that is not the case here, as only standard benefits, of the kind generally available to all private investors, are contemplated.

As there appears to have been some misunderstanding of the role of taxes, a more detailed discussion of the tax aspects is set forth in the Appendix. That discussion points out, inter alia, that the advantages of the Plan do not, in fact, depend upon any particular set of tax consequences. It is important only that prospective investors know what tax consequences to count on.

D. ASSURANCES

The assurances required are set forth in the appendix to the June 29, 1983 report of the BRC Task Force. They are also described in Mr. Katzin's testimony before this Committee.

If the project consisted solely of a conventional generating facility, unrelated to a research and development effort, it is probable that financing the electric power production aspects of the project would require no government assurances beyond those customarily extended by any operator, viz., that the facility was built to specification and would operate as represented. In such a case, a conventional commercial facility would be expected to produce a predictable and reliable income stream.

Here, however, we do not have a conventional commercial facility. The generating capacity is subsidiary to a larger, ongoing governmental research and development effort on which the electrical production and cash revenue streams are dependent. Moreover, the entire Project is managed by the government and is subject to the uncertainties surrounding nearly all government projects. For example, the government might shut down the plant for an extended period for study or experimental purposes--or merely as a result of changed government policy, or of differences between the executive and legislative branches. Given these circumstances, therefore, the electric production aspects of the project will not be saleable without assurances that the actual revenue stream will be uninterrupted and sufficient to cover the debt service.

The fact that the government is in complete command and is expected to manage the Project as a massive research and development effort will inevitably create great uncertainty in the minds of private investors. That uncertainty is within the control of only the government, but it can be removed by government assurances. Uncertainty exacts an economic cost and the elimination of unnecessary uncertainties is generally in the best interests of all parties to a transaction. If the revenue assurances are conservatively set (as we have recommended), they should cost the government nothing. On the other hand, they will help a great deal in attracting private capital on favorable terms.

The only additional assurances to the equity owners are that the expected tax consequences will remain available. Here again, the government can eliminate uncertainty and attract more private capital at no cost to itself. If any of the expected tax consequences are eliminated, in most circumstances the government will be obligated to make restitution. However, that obligation will be offset by increased taxes paid to the U.S. Treasury.*

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* The assurances required are less than those a lessee of equipment generally gives to the owner of the equipment to assure the owner that the rate of return on its investment will not be reduced by unexpected tax consequences.

No effect on licensing and regulatory activities

The Plan does not affect the Nuclear Regulatory Commission ("NRC") licensing process in any way. The Project is not seeking a Congressional waiver of licensing requirements. The Project will have the same NRC review under the new Plan as under the current plan. The same should be true for all other regulatory requirements, and the record should indicate that this is the case.

Why then is an assurance as to licensability needed?

The assurance as to licensability is required to insure that the government managers who have overall construction responsibility will do their job. The private investors are looking to a future revenue stream for their security. But if there is no operating license, there can be no revenue stream. Nor, for that matter, can there be any future R&D benefits.

There is no intent to bypass licensing requirements. The assurance does not guarantee licensing -- it just insures against no license. Of course, the money will not start flowing and the government will have no obligations under the financing plan unless and until a construction permit has been issued.

E. RESIDUAL VALUE

The Project is expected to have significant residual value beyond that assumed in the illustrative example:

- o If more than two billion kwh per year of power can be produced and sold;
- o If this power can be sold for more than 11¢ per kwh, as the passage of time and continuing inflation result in higher avoided costs;
- o If the generating facilities continue to operate after the revenue bonds have been retired, which may result either from early retirement of debt or extended operating life of the facility.

The realization of these residuals may be delayed somewhat because it is expected that a significant portion of any "excess" revenues remaining after all operating expenses and scheduled debt service obligations have been met will be used, in the first instance, for the early retirement of debt and the resulting reduction or extinguishment of the government's contingent liabilities.

Thereafter, it is expected that the residual value will be shared by the government and the equity investors according to whatever formula appears to be most appropriate for the Project, as determined in advance by negotiations with the Secretary of Energy. It would seem reasonable to provide for a government-private sharing of residual values, roughly in proportion to the respective investments, 75% - 25%, if this meets tax requirements.

The value of the residuals is so difficult to estimate that they will not be the subject of a separate payment by the equity owners, but rather, would be considered by them as one of the elements in determining whether to invest, and on what terms.

In any event, no guarantees or assurances of any kind would be provided by the government with respect to the availability of residual values, and any money paid therefor by equity investors would be fully at risk. To the extent that residual values are used to cover unanticipated expenses, the equity holders will share in such costs.

F. RISKS

It has been alleged:

- That the government's risk is increased rather than reduced by the Plan,* and
- That private investors are assuming little or no risk thereunder.

My response is set forth below.

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* 129 Cong. Rec. S. 11187 (daily ed. July 29, 1983)

(i) The government's risk is not increased under the proposed financing plan.

It has been said that "the plan increases the federal government's risk exposure and is almost certain to increase the project's cost."* This is wrong.

Reduced project cost.

The total cost of completing the Project will be substantially less under the Plan, for reasons already discussed, than if paid for 100% with Federal funds appropriated annually in accordance with past practice, even assuming an uninterrupted construction program.

In addition, the net revenues available for debt service will be 2-1/2 to 3 times greater under the Plan because the management incentives previously discussed will cause more power to be produced and that power will be sold at a higher price -- all of which will increase such net revenues by an estimated $75 million a year. (See Section B above.)

The private borrowings (both interim and long-term) will cost somewhat more than direct Treasury borrowings, but not the "one to nine percentage points more" referred to in the above-referenced article. The difference between debt service costs of long-term government debt and private debt supported by government assurances is expected to approximate one percentage point, or less than $10 million per year -- a figure far outweighed by the anticipated $75 million of greater annual revenues available to cover such debt service cost. For short-term construction borrowings, the added annual cost of private debt would be far less than one percentage point per year.

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* Id.

No increased risk.

In order to obtain the maximum market value for these revenues, and thus provide the maximum reduction in appropriations, a number of government assurances will be required, but these do not increase the government's net risk -- they merely substitute a contingent liability for a direct appropriation of the full completion cost.

* * * *

(ii) Significant risks assumed by private equity investors

The risks to be assumed by investors in long-term revenue bonds are minimal for reasons described by Mr. Katzin. However, as stated earlier, uncertainty exacts an economic cost and the elimination of unnecessary uncertainties is generally in the best interests of all parties.

The risks to be assumed by the equity investor are substantial, as follows:

- The period required to realize fully the tax depreciation associated with an equity participation in the Project is unusually long -- perhaps as long as 20 years. This interval introduces a special risk, namely, that the equity investor may not be able to use the expected tax deductions and credits when they become available because he may then have no taxable income. Who could have predicted, 15 or 20 years ago, that Chrysler or Ford or Lockheed or the steel companies would have experienced such a drastic deterioration of their financial condition as has occurred since then?

- Due to the long construction period and the uncertainties surrounding such questions as when depreciation deductions will commence, the equity investor may face significant risks of delay in realizing tax benefits -- even though the ultimate realization of those benefits is assured.
- The unique character of the Project may result in uncertainties as to what tax consequences are "assured," even after a preliminary tax ruling has been obtained.
- If inflation resumes and interest rates rise sharply, the present value of future tax

deductions and residual values will be reduced. In that event, the equity investor will suffer significant opportunity loss, i.e., the opportunity to invest in another project with more predictable results.

- If the project is prematurely terminated, a "recapture" of tax benefits may occur. While the equity owner would expect to be compensated for such recapture, he can suffer considerable loss if the amount of compensation falls short of the investment return he expected when he made his investment. (Note that the recaptured tax revenues would be available to the government to cover the cost of such compensation.)
- Any return anticipated by equity owners as a part of the residual value of the Project will always be fully "at risk."

G. CONTINGENCY PLANS

Any large construction project of this magnitude involves contingencies or uncertainties. The possible consequences of some of these contingencies, such as construction delays and cost overruns, are negative. Other possibilities, such as increases in future revenues due to inflation, can be positive.

Since there is no way to eliminate all uncertainties, we have specified certain government assurances in order to provide saleable investment instruments. On the other hand, we contemplate that any "excess" revenues will be used in the first instance primarily for the early retirement of debt so as to reduce or eliminate the need for such assurances as soon as possible.

In addition, we recommend that, after the Project has been placed in commercial operation, an attempt be made (if the government wishes) to sell stock and use the proceeds to purchase some or all of the facility from the government.

* * * *

A few observations on our contingency planning are set forth below:

(i) Potential schedule delays and cost overruns

There is no way to eliminate these risks entirely, but we believe they will be substantially reduced by the Plan for reasons already indicated, namely:

- o The multi-year one-time appropriation coupled with a flexible pool of available construction borrowing will enable an optimum construction schedule to be adopted and followed. This has not been previously possible.
- o The incentives provided by the Plan will help ensure that the construction team will be well-organized and eager to do their very best.

- The advanced state of engineering and design work coupled with the fact that most of the components are on hand or on order lends considerable credibility to the present schedule and cost estimates.
- Stone and Webster, Westinghouse and Burns and Roe have written letters expressing their conviction that the construction schedule and cost estimates which the Plan relied upon are reasonable and attainable. Based on my own experience at Commonwealth Edison, in connection with our 13 million kilowatt nuclear construction program, I agree.

It should be recognized that if construction cost overruns are caused by higher than anticipated inflation, such inflation would normally be expected to increase the avoided cost of generation to the purchasers of such power and thus the price they would pay for Project power. The resulting increases in revenues from power sales over thirty years of operation, running from 1990 to 2020, should ordinarily outweigh the corresponding effect of inflation on construction costs between now and 1990.

(ii) Higher interest costs

Interest rates are generally a function of inflation rates. If interest rates go to 12% and stay there, the annual debt service requirement may increase from $110 million to $140 million. At the same time, however, an extended period of higher interest rates is almost sure to be accompanied by higher inflation. In that case, the net revenues available for debt service would also be expected to increase to about $140 million annually, assuming that the higher inflation would increase the net value of power sales from 5-1/2¢ to 7¢ per kwh by the mid-1990s.* Moreover, continuing inflation over the life of the Project may well provide further revenue increases far beyond the level needed to cover initially-established debt service requirements.

(iii) Reduced power output

We have tried to be conservative in our estimates of the Project's net generating capability.

We have assumed a capacity factor of only 65% even though the project's output will almost never be restricted by economic dispatch or system considerations. Thus, the 65% capacity output assumption is tantamount to an assumption of 65% equivalent availability. Many nuclear units have availability records far better than that. The CRBR facility was designed to operate at an equivalent availability of 82%.

We believe the Project will, on average, turn out more than two billion kwh annually, year-in and year-out.

(iv) Reduced need for power

A good deal has been said by the opposition as to there being no need for power in the Southeast region.

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* These figures assume that 12% interest rates would be accompanied by 9% or 10% annual inflation rates, which are higher than those used in arriving at the earlier estimates of future net revenues.

To quote from the Congressional Record of July 29, 1983, at S. 11187,

> The plan's authors are rather vague about who will buy Clinch River's electricity. Several utilities have allowed that they might buy some electricity from the plant at avoidance costs,... but no utility has yet been willing to sign binding contracts for purchase of the electricity even under these favorable conditions, much less at fixed market rates. The reason for such reluctance was best explained recently by TVA's general manager, William Willis. As he explained in testimony before the Environment and Public Works Subcommittee on Regional and Community Development in April, "...we do not anticipate having any need for capacity in that time frame" (through the year 2000). [emphasis supplied]

My response to this is as follows:

(a) The TVA's capacity situation is better than that of many utilities in the Southeastern Reliability Council (SERC) region, and the TVA uses very little oil to generate electricity.

(b) The Plan does not contemplate selling power to the TVA because, as stated earlier, a higher price can be obtained from private utilities in the Southeast.

(c) In May, 1983 the SERC wrote to the Project stating that "there is indeed a more than sufficient market for firm power (capacity and energy) in the amounts designed for the

Clinch River Breeder Reactor for the years 1992 and subsequently."

(d) The Project will add less than 1% to the capacity of the region, which could be absorbed by almost negligible load growth.

(e) The power revenues projected in the Plan (11¢ per kwh by 1996) do not include any allowance for capacity credits. If additional capacity is needed in the Southeast and can be provided by the Project, then our estimates will be too conservative.

(f) Finally, so long as utilities in the SERC region are burning oil to make electricity, any additional nuclear generation will be a welcome addition from the viewpoint of both economics and national security.

* * * *

The members of the BRC Task Force, which I represent, are uniformly enthusiastic about proceeding with the Clinch River Project on the basis we have described. We believe it to be financially viable, a useful, important cooperative endeavor between government and industry, and a major contribution to the most promising of the energy technologies which will be needed to eliminate increased reliance on fossil fuels. It has the full backing of the Administration and DOE.

We are looking forward to working with the DOE and the Congress on this Project and we particularly appreciate your having invited us here to testify.

APPENDIX: TAX ASPECTS

All production revenues flowing to private investors will be fully taxable. The Plan contemplates that the private owners of the productive capacity will compute their tax liabilities in exactly the same fashion as other private owners of plant and equipment. Owners of private plants deduct from revenues all of the expenses related thereto, and they depreciate the cost of the plant, as only the difference between revenues and costs is net income subject to tax. Under present law, the time (but not the aggregate amount) of the depreciation deduction is governed by the Accelerated Cost Recovery System (ACRS) enacted by Congress in 1981. Owners of private plants are also eligible for an investment tax credit (ITC) equal to 10 percent of their "qualified" investment. Thus, the private investors under the Plan would have only conventional ACRS depreciation and ITC. No special or unusual tax attributes are involved.

As in any private project, all of the revenues (including those required to cover debt service) will be included in the taxable income of the equity owners, and all of the depreciation deductions and the ITC related to the private investment will be likewise accounted for in the equity owners' tax returns. As in the case of any private project which is debt-financed, interest paid to creditors is deducted from the equity owners' income and included in creditors' income. While the law thus effects a rechanneling of part of the income stream from equity owners to creditors, it does not require or permit a similar rechanneling of deductions and credits. That tax rule makes tax administration easier and does not affect Treasury revenues (because the aggregate amount of income, deductions and credits in the system remains the same). However, in the early years, before and after an asset is placed in service, it causes the net income reported by equity owners to be less than the amount of their deductions and credits. That result flows from the statutory design of the ACRS depreciation deductions and the ITC, the value of which is distributed at the "front end" of an asset's life. It is more visible in the case of taxpayers with a single asset than in the case of taxpayers with a mixture of many assets, as the net income from other assets in the mixture absorbs the net deductions and credits generated by new assets. But the underlying economic flows are the same in all cases.

Whether or not this is a good or bad tax policy is not a question to be decided in the context of any single project. It is a system consciously adopted, refined and expanded by the Congress over more than two decades and designed to encourage new investments and new jobs. Whatever one's policy views, under the present tax structure the tax consequences outlined above are the normal result.

The central point to bear in mind in weighing the Plan is that the Government saving that would result from implementing the Plan has nothing to do with the tax treatment of investors. Private participation under the Plan will result in higher electric revenues to the Project (at no additional cost to electric customers) and more efficient plant operation, whether or not the private participants are fully taxable on the project revenue they receive. While the Plan description assumes the normal availability of tax liabilities and "tax benefits," the Plan does not, in fact, depend upon any particular set of tax consequences. It is important only that the tax consequences be reasonably certain.

There are a variety of tax details that will ultimately have to be settled, one way or the other, such as the status of deductions for interest paid during construction and the appropriate recovery period to be used for depreciation purposes. They will affect the precise amount for which the equity interests can be sold in the marketplace, but will not affect any of the general conclusions reached in the Task Force report. Those detailed questions cannot be resolved in advance of final arrangements for a specific transaction, and the Plan contemplates that the final transaction format will simply accommodate whatever determinations are made with respect to those details. No special handling of such items is desired or expected.

Mrs. **Lloyd**. Well, thank you so very much for your very excellent statement, Mr. Corey.

I think if the whole panel would assemble now, if you can gather around—pardon me. I think, Dr. Houthakker, you're to make a statement next.

Mr. **Houthakker**. Thank you, Madam Chairman.

Let me——

Mrs. **Lloyd**. Is the microphone working? I believe it's working now. I misunderstood. Dr. Houthakker and Dr. Hellman will be making statements, and then we will resume our questioning.

Mr. **Houthakker**. Thank you, Madam Chairman.

Perhaps I should start by saying that I am not against the breeder on principle, and certainly not, as Mr. Corey has reminded us, against nuclear power in general.

As a member of the National Academy of Sciences' Committee on Nuclear and Alternative Energy Systems, known as CONAES, I supported the committee's recommendation to keep the breeder option open.

The committee's reasoning, in brief, was that under certain assumptions, breeder reactors could be economically viable 30 or 40 years from now and, in that case, we have to start and continue the development and demonstration right now. The likelihood of viability was considered large enough at that time 4 years ago to reject abandonment of Clinch River, that most promising pilot project that was around at that time.

I should perhaps add that the National Academy of Sciences Committee did not say that we need an inexhaustible source of energy. I don't believe that is a concept that has a great deal of economic feel.

Let me just remind you very briefly of the economics of breeder reactors. Whether breeder reactors can supply electricity at lower cost than light-water reactors depends essentially on two things, the price of uranium and the cost of the additional capital needed for the breeder. That is a tradeoff which we have to face here.

Given the capital cost, we can calculate at what price uranium will make the breeder competitive with light-water reactors, and we can also do calculation the other way around.

This calculation has been made—I made it myself. It is a complicated calculation because it does involve the entire world energy picture. But, nevertheless, it can be done. And 4 years ago, I came to the conclusion, and the committee came to the conclusion that there was a case for the breeder.

That report that was written 4 years ago and the case for the breeder was speculative at that time. But it looked better than it does now because several factors have moved against the breeder since then. And these are in particular the growth rate of the world economy which has reduced the amount for all forms of energy, new discoveries of uranium, interest rates are much higher, and competing energy fuels, in particular oil, have gone down in price.

Therefore, Clinch River is now much more speculative than it was before. It is not an insurance against what some people think of as the inevitable exhaustion of uranium resources. The fact is the United States and the world as a whole will never run out of uranium. Uranium is a ubiquitous mineral. What will happen only is that, ultimately, it may have to be extracted from leaner ores, such as the Chattanooga shales, once the richer ores are exhausted. It is because of this possibility that the breeder may become economically viable in the more distant future.

Because of the speculative character of breeder reactors, commercial and private sector involvement generally is essential. As Congress has recognized from the beginning, the Federal Government cannot bear the overwhelming responsibility for a project whose national significance, after all, is quite limited.

The Federal Government has finite resources, and, as Congressman Wolpe reminded us a little while ago, there is a great need to do something about the deficit.

Those who believe in the breeder should put their money where their mouth is. They are entitled to a profit if they turn out to be correct; conversely, they should suffer losses if they are wrong. A modest contribution by the Federal Government toward the development of a new technology may be appropriate, but it should not be an open-ended commitment.

The plan put forward by Mr. Corey and his task force is not responsive to the congressional concern for greater participation from the private sector. The proposed joint venture is one in which taxpayers bear all the risk while the so-called partners do just what they would be doing anyway, buying Treasury securities and sheltering their income from taxation. Moreover, the Government would have to make a large up-front appropriation contrary to the established budgetary process.

As to the bonds, I need only quote point 2 of the appendix signed by Mr. Corey. Among the Federal assurances that the sponsors require is, "That all debt service obligations of the project will be met under any and all circumstances." In other words, these obligations would be backed by the full faith and credit of the United States. They would be fully equivalent to ordinary Treasury securities. If the purchase of fully guaranteed Government bonds constitutes private participation, then all Federal activities should be considered joint ventures.

The plan makes much of the idea that these bonds would be outside the budget as if it were an advantage. On the contrary, I believe that the whole idea of off-budget financing is a snare and a delusion, which has created great difficulties in running our economy. Unified budget was enacted because this creative—creative bookkeeping dilutes congressional control and encourages wasteful expenditures. I find it surprising that leading financial houses should support this deceptive practice.

That is not the worst figure of this scheme. The so-called equity participation amounts to nothing more than officially-sponsored tax evasion. The Corey report is relatively frank on this, saying that the equities investment will be supported largely by tax incentives. No doubt the word "largely" should read "entirely."

Later on the page, we had equity investors are, for the most part, anticipating specific tax consequences rather than the speculative profit normally associated with risk-taking. Hence, assurances as to the continued availability of those tax incentives will be required. In other words, if Congress were to close the tax loopholes in question, the private partners in this plan would have to be compensated.

The private financing described in the plan is largely the same as that for any other Federal project. And the remainder involves a thoroughly objectionable reliance on tax loopholes, quite apart from the open end commitment which I mentioned already.

I conclude, therefore, that the plan should be rejected in its entirety. A truly private financing plan would have to involve new risk capital rather than guaranteed bonds and guaranteed tax shelters.

Could such a plan be devised? The task force emphasizes the requirement of pension funds and similar risk of various sources of funds. It doesn't even consider the prospects for raising genuine risk capital. In this respect the task force was realistic. Not many private investors would risk substantial funds in an enterprise whose payoff is so uncertain and will come at such a late date.

Mrs. **Lloyd**. Dr. Houthakker, I think we will—are you about through? We have a vote.

Mr. **Houthakker**. Yes. May I just finish in 1 minute?

Mrs. **Lloyd**. Please.

Mr. **Houthakker**. I would just like to say then that there is no possibility of truly private participation and, therefore, Clinch River will have to be postponed indefinitely. In fact, Clinch River as such is probably not the optimal project any more anyway. If we ever resume the breeder prospect—and I believe there is a good possibility—it will be with something different. Perhaps we will learn from the Fast Flux Test Facility that Congressman Hansen was talking about.

I also would like to remind you, as somebody else already has, of the SST, which gives us—is an exact parallel. We are not abandoning the world market to the French, because there simply is no world market for the breeder in the foreseeable future.

Thank you very much.

Mrs. **Lloyd**. Thank you very much, sir.

We will now stand in recess because we have a vote.

[Recess.]

Mrs. **Lloyd**. The subcommittee will come to order.

Dr. Houthakker, I'm sorry that I had to sort of cut you short a little bit. I hope that you did have time to finish your statement in its entirety. You had time—you had about a minute left, if you would like to add to your statement.

Mr. **Houthakker**. Madam Chairman, if I may, I understand that I did speak a little hastily toward the end when I had to finish. And I may have made one statement that I would like to correct once I got the manuscript——

Mrs. **Lloyd**. Please proceed.

Mr. **Houthakker** [continuing]. Which was more definite than I wanted to have it made. It is correct in my prepared statement, but in summarizing it I may have made it more emphatic than it should be.

Mrs. **Lloyd**. Well, your full statement will be made a part of the record.

Thank you very much.

[The prepared statement of Mr. Houthakker follows:]

Can Clinch River Be Privately Financed?

statement of
Hendrik S. Houthakker
Harvard University
before the
Subcommittee on Energy Research & Production
U.S. House of Representatives
Washington, D.C.
September 15, 1983

Madam Chairman, I have to thank you for allowing me to testify on the so-called private financing plan for the Clinch River breeder reactor. To begin with, let me emphasize that I am not opposed to the breeder on environmental or other non-economic grounds. As a member of the National Academy of Science's Committee on Nuclear and Alternative Energy Systems (CONAES) I supported the Committee's recommendation to keep the breeder option open. The Committee's reasoning, in brief, was that under certain assumptions breeder reactors could be economically viable thirty or forty years from now, and that the lead time needed for commercialization is measured in decades rather than in years. The likelihood of viability was considered large enough to reject abandonment of Clinch River, the most promising pilot project at that time.

The economics of breeder reactors is quite simple. Whether such reactors can supply electricity at lower cost than light-water reactors depends principally on only two things: the price of uranium and the cost of the additional capital needed for the breeder. Given this capital cost, for instance, one can calculate the lowest uranium price that will make a breeder competitve. Similarly, a given uranium price determines how much capital can profitably be invested in a breeder. In this context "capital cost" involves not only the investment itself but also the lifetime over which the investment should be amortized as well as the rate of interest.

The CONAES report was written four years ago. Even then the case for the breeder was recognized as speculative, depending as it does on the future course of many factors, most of them difficult to predict with any assurance. These factors include the growth rate of the world economy, new discoveries of uranium, interest rates, and the prices of competing energy fuels. Since 1979 these four factors have all evolved in directions unfavorable to the economic viability of breeder reactors. The world economy went through a severe recession, considerable low-cost uranium was discovered, interest rates rose (especially in real terms) and the price of oil declined. It is still conceivable that breeder reactors will be competitive three or four decades from now, but it is distinctly less likely. Clinch River is more speculative than ever.

The description of Clinch River as speculative may surprise those who think of it as insurance against the inevitable exhaustion of uranium resources by non-breeding reactors. The fact is that the U.S. will never run out of uranium, which is widely distributed in the earth's crust. What will happen, rather, is that ultimately uranium may have to be extracted from leaner ores, such as the Chattanooga shales, once the richer ores are exhausted. Uranium will then probably cost more, which will cause breeder reactors to look better from an economic point of view and uranium mining to decline. Actually there is no compelling reason why the U.S. should use only domestic uranium. There are large low-cost reserves in Canada, Australia and other friendly countries.

It is because of the speculative aspect of breeder reactors that private sector involvement in their commercialization is essential. As the Congress has recognized from the beginning, it would be unconscionable for the Federal government to bear the overwhelming responsibility for a project whose national significance is quite limited. By now we all know that the resources available to the Federal government are finite and must be allocated more carefully than in the past. Those who believe the breeder has a future should put their money where their mouth is. They are entitled to a profit if they turn out to be correct; conversely they should suffer losses if they are wrong. A modest contribution by the Federal government towards the development of technology may be appropriate, but it should not amount to an open-ended commitment.

The plan put forward by the Corey taskforce, and endorsed by the Administration is not responsive to the Congressional concern for greater participation from the private sector. In fact it does not provide for any meaningful participation by the private sector. The proposed "joint venture" between the Federal government and private parties is one in which the taxpayers bear all the risk while the so-called partners do just what they would be doing anyway, namely buying riskless government bonds and sheltering their income from taxation. Moreover the government would have to make a large up-front appropriation, contrary to the established budgetary process.

As to the bonds to be issued under this plan, it suffices to look at point two in the Appendix signed by Mr. Corey. Among the Federal assurances that the sponsors require is "that all debt service obligations of the Project (...) will be met under any and all circumstances." In other words, these obligations would be backed by the full faith and credit of the U.S. They would be fully equivalent to ordinary Treasury securities. If the purchase of fully guaranteed government bonds constitutes "private sector participation," then all Federal activities should be considered joint ventures.

The plan makes much of the idea that these bonds would be outside the budget, as if that were an advantage. Whether Federal obligations are inside or outside the budget is irrelevant from an economic point of view. The Unified Budget was enacted precisely because this sort of creative bookkeeping dilutes Congressional control over the budget and encourages wasteful expenditures. It is surprising that leading financial houses should lend their support to this deceptive practice or to the statement on p.1 of the Executive Summary that the bonds issued under the plan "would reduce the Federal budget deficit at a time when budgetary expenditures are of widespread concern." This statement alone suffices to characterize the plan as a brazen attempt to mislead the Congress and the public.

But that is not even the worst feature of this ingenious scheme. The so-called equity participation amounts to nothing more than officially sponsored tax evasion. The Corey report is relatively frank on this, stating (p.18) that "the equity investment will be supported largely by tax incentives." No doubt the word "largely" should read "entirely." Later on the same page we read that "[e]quity investors (...) are, for the most part, anticipating specific tax consequences rather than the speculative profit normally associated with risk-taking. Hence assurances as to the continued availability of those tax incentives will be required." What this means is that any attempt by the Congress to close the tax loopholes in question would lead to monetary compensation for the equity participants in the joint venture. To call this equity participation is surely straining financial terminology.

Looking at the three parts of the joint venture plan together one can only conclude that the private financing it describes is largely the same as that for any other Federal project, and that the remainder involves a thoroughly objectionable reliance on tax loopholes. Moreover the government would have to make an open-ended commitment to the project into the indefinite future without any opportunity for further Congressional or Presidential review. These are the essentials of the Corey plan. More could be said about the details, but that would be overkill. The plan should be rejected in its entirety.

A truly private financing plan would have to involve new risk capital rather than guaranteed bonds and guaranteed tax shelters. Could such a plan be devised? The Corey task force report emphasizes the requirements of pension funds and similar risk-averse sources of funds; it does not even consider the prospects for raising genuine risk capital. In this respect the task force was realistic. Not many private investors will risk substantial funds in an enterprise whose pay-off, uncertain at best, will certainly not come until well into the next century.

Truly private participation in Clinch River, on a scale commensurate with the fully justified intent of Congress, does not appear to be feasible. The implication is that Clinch River must be terminated. Perhaps the breeder option will have to be reopened at a later time, when the outlook for uranium prices and interest rates is more clearly in favor of the breeder than it is now. If and when that time comes, Clinch River will probably be obsolete; some experts consider it obsolete already. The Federal Government should continue to support research on new breeders and related technologies.

Termination of Clinch River will not weaken our energy security in the foreseeable future, though it could under certain conditions have an adverse effect in more distant years. We should not worry either about abandoning the world market for breeder reactors to the French. This world market is simply too hypothetical. The factors that have dampened the economic prospects of the breeder in the U.S. are at least as strong in the rest of the world. The French themselves have become noticeably more subdued; thus in recent official reports on electricity the words "Super Phoenix" and even the French equivalent of "breeder reactor" are conspicuously absent. A historical parallel exists: when the U.S. abandoned the Supersonic Transport a dozen years ago, there was much concern about leaving the field to the French-British Concorde. Yet apart from a few heavily subsidized transactions with their own captive airlines, no Concordes have ever been sold: there simply was no world market.

On the other hand the termination of Clinch River will be a small step towards the most urgent task facing the Congress and the Administration at present, which is to bring the budget deficit under control. This should be done not by bookkeeping tricks, as the Corey task force proposed, but by cutting out projects of marginal value if meaningful private participation cannot be obtained. The Clinch River reactor is clearly in that category.

Mrs. Lloyd. Dr. Hellman, we now look forward to hearing from you.

Mr. Hellman. Thank you.

A bit of biography. I was consultant to the Federal Energy Administration on a study maximizing private risk taking, and discussed with Morgan Stanley and the other companies involved, for example, in the Alaskan Gas Pipeline financing, this very subject. And since it's relevant, I mention it.

Also, I was Director of Loan Review for the National Production Authority, and had much experience with this kind of financing. And at the Federal Power Commission, was assistant to the chairman and economist at the Bureau of Power and supervised the economic power market studies.

My full vita in my advanced testimony gives further relevant details.

The first point I want to make has to do with the cash tax benefits. By way of introduction, the financial plan is extraordinarily frustrating in either faulty disclosure or inadequate disclosure.

So what I'm doing is giving you the numbers I've made up, and I'm sure that the planners will correct me, and I will be glad to be corrected if not correct. I'm basing what I say on the plan as it was specified and what I had to infer from the plan because it wasn't specified.

Basically, I find that the construction period cash tax benefits to the $150 million of equity will be $368 million. And that will be taken roughly in the first 2-plus years of the construction—most of it.

I get the $368 million as follows. I have investment tax credit of 10 percent——

Mrs. Lloyd. Pardon me, Dr. Hellman. Would you start over again? What did you—would you start again at your participation at the board?

Mr. Hellman. I will.

You have the $150 million of equity which flows all of the tax benefits on the billion dollars. The basis is a billion. Now I know I heard the figure $850 million. I've heard—I've seen the figure $1.365 billion. And I must say I put it all together from the plan. The plan is very fuzzy on this. That's what I meant by frustrating. I hold it against the plan and the planners that they turned in such a fuzzy plan. I'll come to that later.

But, anyway, you—if it's $850 million, you just take 85 percent of these numbers and you will not change the text except for the numbers.

Mrs. Lloyd. $825 million, I believe, is——

Mr. Hellman. $825 million.

Mrs. Lloyd. $825 million. That's correct.

Mr. Hellman. The $368 million I get by taking a 10-percent investment tax credit because Mr. Katzin said they're going to take 5 years depreciation. If it were 3 years, they could only take 6. So I'm using the 10.

The interest during construction, which he says they will expense, likely, is $365 million and it's 46 percent. It is $168 million. And again, I estimate it will be taken within 2-plus years, that is, in less than 3 years, the way I've seen the schedule. Almost all of it. There's a little bit at the end, but almost all of the expenditure is in the first 2 to 3 years.

So that's $300 million and—that's $168 million. And for some reason I don't understand, the plan does not mention anything about the energy tax credit. Now from my conversations with the tax counsel at the Treasury, there is a good chance that they can take it. And since my purpose in this table is as much to force the plan to say yes or no, I'm putting it in because if I were the planners, I would take it if I could.

So that gives me another $100 million, 10 percent on a billion. And the total comes to $368 million within the first 3 years, probably 2-plus years the way the calendar year taking works.

Now, that's construction, and I think that corresponds—I take that to correspond to what the plan says is immediately available. The plan speaks of 15 percent on a billion of cash tax benefits immediately. That's their word. Mr. Katzin has modified that to almost immediately. So, I'm taking it in that sense.

Once they start operation, they take depreciation in 5 years, or 4-plus if the calendar works right, and at 46 percent on $900 million—not the billion now, because you have 10 percent and 10 percent, and you have to take half of that off the depreciation base. So, you take 20 percent of a billion is $200 million, and half of that is $100 million, and so the billion is reduced by $100 million. And you now have $900 million depreciation base, and they take at 46 percent $414 million of cash tax credits flowing through to the equity.

I would like to make the more detailed table a part of the record, Madam Chairwoman, if you will permit.

Mrs. **Lloyd**. I certainly will, Dr. Hellman. And also for the record, would you also base your figures on a $825 million basis for tax benefits as well?

Mr. **Hellman**. I will do that.

[The information follows:]

Prof. R. Hellman
Univ. of Rhode Island

CASH TAX BENEFITS TO EQUITY PARTNERS
CLINCH RIVER BREEDER REACTOR

		Base amount of items by type of savings (in millions)		Calculation of tax benefits (in millions)		
Time Period	Tax Savings By Item	Deductions	Credit	Basis	$value	Notes
A. Construction	ITC		$1,000	10%	$ 100	assumes 5 year dep.
	IDC	$ 365		46%[a]	168	a
	ETC		$1,000	10%	100	
	Total				368	
B. Post Construction Operations	Depreciation	900[b]		46%[a]	414	a,d
	R&D			25%	?	c
					782 plus any R&D credit.	

Footnotes:

a) 46% if a corporate partner, 50% if lender is a private individual.

b) Depreciation base is reduced by 1/2 ITC and ETC=20% of $1 billion, leaves $900 mill.

c) R&D tax credit is on non-depreciable property, mainly wages and supplies during operation, assigned to R&D part of Clinch River. It can only be taken by partners against net income of breeder, and not against unrelated income of partner.

d) 5 year ACRS at accelerated depreciation is equivalent to 150% of D.B.

Mr. **Hellman**. But I urge the planners to make clear just what they're talking about.

Mrs. **Lloyd**. Thank you so very much.

Mr. **Hellman**. Now I'll go on with my testimony.

My next point again puzzles me on the testimony because nothing was said about it. The entire fiscal analysis is based on the 11 cents a kilowatt-hour. And I find that the total cost of the project, taking what I find in the plan, and taking capital at 20-percent fixed charges per year—and the case can be made out, and is made out in my advance testimony, which is available to you—I find that the cost per kilowatt-hour on the $4 billion will be 45 cents. And that's an extraordinarily important number to me.

Now, as you know, Mrs. Chairwoman, my collaborator and I just printed—put out a book, "The Competitive Economics of Nuclear and Coal Power," where we took the basic estimates of Exxon and so on, and applied some corrections for reality.

When we correct a 30-year life—with due respect to Mr. Corey—or a 25-year life, which we explain thoroughly in here, and apply a 50-percent capacity factor, which is explained in our advance testimony, instead of a 65, the 45 cents goes to 65 cents per kilowatt-hour.

Mrs. **Lloyd**. What are you basing the life of the plan on?

Mr. **Hellman**. On a 25-year life, and we make out an excellent case for it which I've never seen refuted. And also a 50-percent capacity factor which is, I think, the maximum that can be used prudently for planning purposes. I must emphasize for planning purposes is what—which is what the planners are doing. They have no basis for predicting a 65-percent nameplate generate—generated nameplate rating from experience.

Mrs. **Lloyd**. But you are basing this on a 25-year life.

Mr. **Hellman**. A 25-year life. It's all specified. And a 50-percent capacity factor, because the light-water reactors are operating—have operated and are operating at about 55 percent, and this being experimental will be less, I should think.

Anyway, I come out to 65 cents if I add what I consider, in view of the track record of the light-water reactor industry, only 25 percent for technological problems increasing the cost—not general cost—general price level.

I add another 10 cents, which brings it up to 75 cents. Now, all I am saying is somewhere between 45, which I get out of the plan, roughly, and 75 is what I consider the total cost of this plan.

Now true, it is an R&D plan, and an experimental breeder, but if you read the plan carefully, they are talking as though this is a plant which can deliver firm power and peaking power. I mean, it is all in there. It is a waffling which I find very difficult to analyze.

Mrs. **Lloyd**. Thank you very much.

Mr. **Hellman**. I am not through, though. Have I taken my 10 minutes?

Mrs. **Lloyd**. Yes, your time has expired.

Mr. **Hellman**. I have some very important points.

Mrs. **Lloyd**. I think it is now—we will be happy for you to submit them for the record with our other witnesses.

[The prepared statement of Mr. Hellman follows:]

Advance Statement of Richard Hellman*
Professor of Economics
University of Rhode Island

On:

The Financial Plan for the Clinch River Reactor
As Proposed by the Breeder Reactor Corporation Task Force
June 23, 1983

For the Hearing of March 15, 1983 before
The Subcommittee on Energy Research and Production
of the Committee on Science and Technology,
U.S. House of Representatives

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(*) I acknowledge the advice and assistance of Professor Caroline J.C. Hellman, who co-authored our recent book, The Competitive Economics of Nuclear and Coal Power (1983, Lexington Books), and who was co-contractor and co-author of our study for Federal Energy Administration on maximizing private risk-taking in alternate energy sources.

I. INTRODUCTION

The fundamental premise of the financing plan of June 23, 1983 by the Breeder Reactor Corporation Task Force (TF) is that the Congress did not distinguish between who supplies the funds, and who takes the risk for those funds. This refers to the mandate of December 20, 1982 to "secure greater participation from the private sector." It is clear that the partners, who stand at the top of a corporate pyramid, will receive cash tax benefits substantially in excess of their equity input of $150 million, at no risk whatsoever to themselves, and at 100% risk to the US government. It is also clear that they will be operating on guaranteed cost-plus, with a blank check underwriting by the US.

The benefits to the US, against the great loss of tax revenues, are stipulated by the TF to be chiefly, (1) the input of $1 billion of private money, including the equity, which, though at US risk, will not appear in the appropriated budget; and (2) the quality of management to be supplied by the partnership. Since the Clinch River Breeder (CR) is described by the TF as "experimental research and development" without a track record in the US, for planning purposes the possibility that the US may have to make good that debt, thus incorporating it into the appropriated budget must be evaluated as substantial: substance is lent to this possibility by the absolute unwillingness of the TF to assign any risk whatsoever to the private capital.

With regard to the benefits of the partnership management, which are not spelled out by the TF, who and from where will this management come? It would seem that it must come from the experienced sector of light water reactor (LWR) utilities, the associated architect-engineers and constructors, and equipment suppliers. Looking at the dismal record of these groups, on what basis does the TF think that it will do better? Moreover, if good management is a problem the government can buy it without conferring the guaranteed cost-plus and tax concessions required in the TF plan.

Evaluation of the TF plan in other respects is made difficult and frustrating by inadequate and faulty disclosure. At many vital points, the plan per se is confusing or blank. Since the purpose of the plan is to induce the US to continue and complete a $4 billion project, while conferring tax boons with a fullness perhaps unprecedented in US history, there is a fair probability that as a prospectus drafted by four of the greatest security houses in the world it would not meet the test of the Truth-in-Securities Act and would be disallowed by the Securities and Exchange Commission.

In the balance of this presentation, the TF plan will be analyzed, questions will be suggested; and a few conclusions and recommendations may be offered in the oral testimony to be given at the Subcommittee's invitation on September 15, 1983.

II. ANALYSIS AND QUESTIONS

A. RISK.

The open-ended, blank check guarantees of the private money by the US are total. They do not seem to allow any omission. "Under any and all circumstances" the US is to guarantee debt service and "its obligations to equity investors." Included are noncompletion of the project as well as operating cash deficits. Under noncompletion, not only is the equity to be made good, but the profit that should have been earned on equity at a rate unspecified. "All" tax benefits are to be guaranteed "as planned." Apparently if the project cannot fulfill commitments to deliver energy, the US guarantees to assume liabilities for replacement power costs: given the uncertainties of an "experimental R&D" project, this liability can be large, particularly as the plan permits the inference that it will be a commitment for firm baseload or even peaking power. "All" uninsurable tort liabilities are to be picked up by the US: this would seem to refer to accidents resulting in widespread damage and injury from radioactivity. Because plutonium is involved, these liabilities can be of tremendous magnitude, thus perhaps explaining the reason this assurance is required in the plan. Finally, the US is to assure the equity holders that the necessary legislation for these guarantees will be secured from the Congress.

The risk-taking complexion of the TF plan itemizes as follows:

$4,000.		million is total cost of project, per plan
1,500.		has already been invested, almost all by the US
2,500.		is still to be invested to complete the project of which:
	1,500	by the US
	150	as equity by the partnership
	175	money previously committed by utilitie
	675	by insurance companies and other fiduciaries, and possibly vendors and contractors.

The plan is not clear on the division above, and at times is confusing. The numbers given above are the best interpretation.

B. TAX BENEFITS TO PARTNERS

The losses of the CR (Clinch River breeder) will appear on the books of the Breeder Reactor Corporation, the American Energy Development Corporation, and the partnership, in ascending order of the pyramid. The tax benefits, however, will not appear on any of these books. They will appear on the books of the individual partners, which books are technically private, and outside the orbit and audit of the CR financial operations *per se*.

The plan specifies that tax benefits will be taken "only to those conventional investment tax credits and tax deductions for depreciation, R&D, and other costs ... attributable to project expenditures paid for with private funds." While not entirely clear, this would seem to apply to the $1 billion on which the plan focuses. Since, however, the $1 billion includes $175 million of new utility money, by the same principle it raises a question of whether the $150 million previously contributed by utilities will also be included in "private funds" and so make the tax benefit base $1.15 billion rather than the $1 billion specified in the plan.

The "immediately realizable value" of tax benefits is given by the plan as 15% of $1 billion, or $150 million. It is not clear what is meant by "immediately". If it applies to the construction funds, it would consist of investment tax credit (ITC), interest during construction (IDC), and perhaps other credits. Once construction is completed and electricity output begins, the benefits from depreciation and other possible items are over and beyond the $150 million. Thus the partnership recaptures its $150 million equity investment "immediately", and has additional savings thereafter exceeding the equity. These also include "participation in future excess revenues and residual values". Residual values refer to improved efficiencies over and above those postulated in the plan, higher energy prices, and a life of plant longer than the assumed 30 years.

"Only conventional construction-related tax incentives will be available" on private investment, according to the plan. It is not clear, however, whether any operating losses after construction would also be taken prorata private investment, or on some larger base including, for example, government funds invested not from direct appropriations but from funds borrowed by DOE from a US lending entity such as exists in the Treasury Department.

B-1. INVESTMENT TAX CREDIT (ITC)

This is a credit, dollar for dollar, against taxes. It differs from a "deduction" of which only 46% at maximum can be taken against corporate taxes as a cash saving, or 50% if taken directly against personal income taxes.

The ITC is either 6% or 10% of investment: 6% if the post-construction depreciation is taken for a 3-year life, or 10% if for more than 3 years. For an LWR nuclear plant, it is a 10-year depreciation, but for the experimental R&D CRBR, it probably would be taken as 3 years and 6%, or possibly 5 years and 10%, depending on how the partners calculate their gains. For the CR, progress payments during construction can be taken on ITC as quickly as private funds are expended.

Question-1: What depreciation period does the partnership plan?

Q-2: What percent ITC will be claimed?

Q-3: What is the timing of claiming ITC?

Q-4: Will ITC be taken on the $150 million already contributed by the utilities, in addition to the $1 billion?

Q-4: Will ITC be taken on the full $1 billion in the plan, or only on some fraction such as the borrowed construction funds?

B-2. DEPRECIATION

This begins as soon as construction is completed and energy is sold. Under the 3-year option, depreciation per year is 25%, 38% and 37%. If the CR is declared as productive on December 31, 1989, as an illustration, the full 25% will be taken for 1989. If taken against corporate taxes, the depreciation would be, on the $1 billion; $250 million, $380 million and $370 million, with corresponding tax savings to the partnership of $115 million, $175 million and $170 million.

B-2. Depreciation (cont.)

The table below shows the cash savings by depreciation on the 3-year option, based on the $1 billion base:

Year	Depreciation ($ million)	Tax Saved, $M 46%	Tax Saved, $M 50%
1	250	115	125
2	380	175	190
3	370	170	185
Total	1,000	460	500

NOTE: For simplicit depreciation is show on the full $1B, whi would be reduced, ho ever by half the ITC Energy tax credit, and R&D tax credit.

Since all of this depreciation accrues to the $150 million of equity, it is seen that the depreciation cash saving is over three times the equity. To this must be added the saving on ITC and IDC, and other tax benefits.

Q-1: While the plan states that there will be no benefits to the partners on "Federal appropriations," does this exclusion apply if the Federal investment is in the form of debt from Federal lending entities such as at the Treasury Department?

Q-2: If funds are invested by vendors and contractors, as the plan states is possible, will these be in addition to the basic $1 billion, and will tax benefits be taken by the partners on these inputs?

Q-3: Does partnership plan to take depreciation?

B-3. INTEREST DURING CONSTRUCTION (IDC)

The plan shows $365 million as IDC related to the basic $1 billion. It is assumed that this interest will be taken as tax deductions by the partnership, with 46% or 50% cash savings, or $168 million and $182.5 million respectively.

Q-1: (a) How was the $365 calculated?
(b) How much will be taken for taxes "immediately"?
(c) Will it be taken on the $150 million of past utility contributions?

Q-2: From what entities will bonstruction funds be gotten and how much will carry tax benefits to the partnership?

Q-3: At what point in time will the various parts of the $1 billion be invested in construction funds?

B-3 IDC (cont.)

Q-4: The plan (p. 17) assumes a 10% interest for construction funds. On what basis?

Q-5: The plan (p. 17) assumes construction interest will be paid to "mid-1990". How does this square with a completion date of 1990?

B-4: ENERGY TAX CREDIT (ETC)

There is a special ETC which can be 10% or 15% -- more likely 10% in the case of CR. It works like the ITC, being taken against taxes dollar for dollar, and can be taken against construction progress. There is a good possibility that this credit applies to CR under current legislation, but also there are uncertainties in the regulations and their interpretation. If taken, they can be substantial. Since the plan specifies that the US secure legislation necessary to meet its terms on tax benefits, the possibility of benefits to the partnership must be considered, unless the partners specifically state that they are not going to claim the ETC.

Q-1: Do the partners intend to claim an ETC?

Q-2: If yes, on what amount of input will they want it?

Q-3: If yes, at what time during construction will it be requested?

Q-4: What percentage will be requested?

Q-5: Will the ETC be requested under current law and regulations of the IRS, or under special legislation?

B-5. RESEARCH AND DEVELOPMENT CREDIT (R&D)

This is 25% credit, like the ITC and ETC. It is taken during operations (after construction is completed) on items like wages, supplies etc. Here, too, there are uncertainties as to IRS regulations and their interpretation when issued. However the plan specifically mentions tax benefits from R&D, and therefore this possibility must be considered. There is no elaboration in the plan on what the R&D credit involves.

Q-1: On what part of the operating expenses of the CR will the partnership claim the R&D credit?

Q-2: What does the plan envision as the annual value of this credit?

B. TAX BENEFITS (cont.)

B-6. OPERATING LOSSES - EXCLUDING DEPRECIATION

Cash operating losses are entirely possible, as the plan recognizes and demands US back-up. They may occur either because revenues fall short, or expenses exceed the plan, or interest rates are higher than the postulated 10%.

While the plan stipulates that any shortfalls in operating revenue will be underwritten by the US, there is a question of whether the partnership posits circumstances under which operating losses will occur, against which taxes of the partners may be offset. The plan is silent on this point.

Q-1: Does the partnership anticipate cash operating losses to be used as a tax benefit?

Q-2: If yes, how will this work?

B-7. ENERGY PROJECTIONS

The source of revenues will be sales of energy from the 350 megawatt breeder. The plan assumes a 65% capacity factor (CF) giving 2 billion kilowatt-hours (kwh) a year. While much is unclear about the kind of energy to be supplied, it appears to be in part firm power (baseload), and in part peaking power which is even a higher grade. Since CR is an experimental R&D plant, these expectations seem entirely too high. This is confirmed by the requirment by the partnership that the US guarantee any shortfall in supplying firm commitments by assuming liability for replacement power. This would appear to mean either because of operations below plan, or total unplanned shutdowns. Thus it must be considered a fair possibility that revenues will fall below the plan and, other things equal, lead to cash deficits.

Q-1: Since the present LWRs in the US have lifetime CFs averaging 55%, and recent CFs at the same level, after 23 years of experience, how prudent is it to plan for 65%?

Q-2: For an experimental breeder, would a 50% CF be more realistic for planning purposes?

Q-3: Is the plan to sell all of the power to TVA, as the present contract requires, or to request a waiver so as to sell on opportunity to oil- and gas-burning utilities outside the TVA area?

B. TAX BENEFITS (cont.)

B-8. PRICE OF ENERGY

The plan assumes a price of 11¢ per kwh sold, apparently for firm and peaking power replacing oil/gas generation. In the current contract binding TVA, DOE and the utilities, TVA takes all of the CR energy at TVA's incremental cost for fuel. Compared with the 11¢, the TVA could be a half to a third less. Strictly within this framework, the 11¢ seems too high and could give a shortfall in revenues below the plan.

It may be inferred from the language in the plan that the partnership hopes to obtain a waiver by TVA of its call on all the CR energy, and sell it elsewhere at gas/oil replacement prices. This assumes, however, that over the period 1990-2020, the planned operating life of the CR plant, there will be a market for the energy at 11¢. However, oil/ gas plants have not been ordered since, roughly, 1973, so that it is questionable how many will still be operating as baseload power by the mid-point of the CR life, 2005. An assumption, also mentioned in the plan, that inflation in energy prices long run will overtake and exceed the 11¢, seems a somewhat speculative basis for planning CR revenues.

Finally, it is most doubtful, as explained elsewhere above, that an experimental R&D breeder base its financial projections on selling firm and peaking power.

> Q-1: Precisely how was the 11¢ derived? In what proportions would there be firm, peaking, and unconditionally interruptible power, and at what prices for each?
>
> Q-2: what inflation rate does the plan assume in arriving at the 11¢? Where does it come from?

B-9. CASH OPERATING EXPENSES

The plan assumes 5.5¢/kwh for operating costs, including fuel. Given the experience with the LWRs for nonfuel operating costs, which have escalated above any projections particularly due to major repairs and replacement and retrofits, it is prudent to know the basis of the 5.5¢.

B-9. CASH OPERATING EXPENSES (cont.)

Q-1: Does the plan envision a better operating record than is being experienced for the LWR?

Q-2: How does nonfuel Operating and Maintenance (O&M) expense for the CR compare with LWR actual experience?

Q-3: If a 50% CF is used, what will O&M excluding fuel be?

Q-4: How much provision is made for casualties, major repairs and replacement, retrofits and unforeseen casualties?

Q-5: How much does the plan allow for more expensive handling costs for plutonium containing elements due to the greater risks of radioactivity?

B-10. BREEDING RATIO

An essential justification for the breeder, and perhaps the greatest uncertainty in reality, is the assumed breeding ratio of fuel. To date, the ratio may be largely a scientific and engineering possibility, more than reality.

Q-1: What is the breeding ratio assumed for CR?

Q-2: What actual experience is there to back this up?

Q-3: What is the probability, in view of the track record experienced with the LWR, that it will be achieved? What breeding ratio is being averaged by the French Phenix?

B-11. PLUTONIUM SUPPLY FROM LWRs

The principal source of supply for the CR has always been assumed to be spent fuel rods from LWRs which are reprocessed, with the plutonium going to the CR. The record of reprocessing as of today is: West Valley shut down and a pollution problem; the General Electric plant at Morris (Illinois) built and abandoned; the Barnwell (S.C.) unit never finished, apparently because of a technological and economic failure before completion; and a fourth proposed plant aborted. There is no reprocessing of fuel rods in the US today. Therefore on what supply does the CR count for fuel? If from the US military supplies, under what terms and at what costs and for how long?

II. ANALYSIS AND QUESTIONS (cont.)

C. MANAGEMENT

Under the current contract for CR, TVA is to manage the project. Under the partnership plan, who will manage? What will be the partnership role? What will be the management's experience related to the breeder?

If management is to come from the LWR industry as it has existed for the last 25 years and exists still today, does the standard of excellence or non-excellence of this management meet the requirements of the CR as envisioned by the partners?

Roughly, by what calculations does the partnership assume that its management plans will result in a better experience than that of the LWRs to date? and produce a 65% CF with a reliability equal to firm and peaking power?

Finally, does the partnership believe that it can supply a quality of management significantly more efficient than what the US could purchase and save the hundreds of million dollars in tax benefits to the partnership?

D. TOTAL COST PER KWH VS 11¢

The total cost per kwh of the CR power may be inferred from the plan to be approximately 45¢, calculated as follows:

5.5¢	for O&M and fuel, per plan
40.0	for capital cost of $4 billion
45.5	total

The 40¢ for capital is not mentioned in the plan. It is calculated by assuming 20% fixed charges on capital per year, or $800 million. Divided by 2 billion kwh per year, it gives 40¢. The 20% is taken as an approximation of fixed costs under the uncertainties of this experimental R&D breeder, to be used as an analog for a later commercial plant 100% privately owned and risked.

Subtracting from 45¢ the plan's revenue of 11¢ gives a loss of 34¢ per kwh. This is a more realistic statement of the operations of the Clinch River breeder.

E. BUY-OUT BY THE PARTNERSHIP

Given a total cost of 45¢/kwh, and a possibly unrealistic 11¢ of revenue, what did the partnership have in mind when suggesting that it might buy out the government's interest under favorable circumstances? at what price?

In the present contract on CR, TVA has an option after five years of operation to buy the plant. It specifies that the plant must be able to operate above 80% CF, have a high degree of reliability, fit in with the rest of the system, and cost no more than alternate power available to it. The probability that TVA would buy CR at any price approaching the equivalent of 45¢/kwh seems totally unrealistic.

F. THE CLINCH RIVER PLANT AS A FORECASTER OF A COMPETITIVE COMMERCIAL FAST BREEDER

Translating the CR demonstration experimental R&D breeder into a follow-up commercial breeder of the same technology, and starting with the 45¢ cost, what is the probability that the 45¢ can be brought down to a competitive level? What, in ¢/kwh, is that competitive level in the year, say, of 2,000? What are the terms as to CF, life of plant, comparable capital cost, etc.?

Under the above stipulations, what is the value of CR as a prototype for commercializing its technology?

Are there substantial professional dissents as to the value of that technology?

Are there better technologies which should be given priority for the investments proposed for Clinch River?

How much is known to the partnership and the DOE regarding the economics of the French Phenix and Super-Phenix? regarding their breeder ratios?

End

Prof. Richard Hellman

Vita

EDUCATION. PhD and BA in Economics (regulatory and energy), Columbia University.

EXPERIENCE.

Professor of Economics, University of Rhode Island, 1970-date.
Director, Research Center in Business and Economics.
Advisor to Governor on economics of proposed nuclear plant in Charlestown.
1976-7: sabbatical study of economics of nuclear power in Europe under ERDA/DOE contract. Consultant, Federal Energy Administration.

US Small Business Administration, 1967-70: Director for Research and Planning and Deputy Assistant Administrator.

US Department of Commerce, 1951-67: Economist, Research Division. Director of Defense Loan Review, National Production Authority.
Economist, Office of Industrial Mobilization: Chairman of Industry-Government Task Force on Vertical Industrial Production after a Nuclear Attack.
Advisor to Administrator of Business and Defense Services Administration on peaceful uses of nuclear energy.
Commerce representative to National Relocation Center in event of nuclear attack.
Directed study of location of first commercial nuclear power plant in US.
Liaison with Area Development Administration on loans and grants.
Economist to President's Cabinet Committee's study of the economics of the supersonic transport plane.
Member, Board of Civil Service Examiners for Economist Examinations.

Federal Executive Fellow, Brookings Institution: study on regulation of electric utility industry of the US.

US Public Housing Administration, 1949-51: Economist.

Federal Power Commission, 1940-49: Assistant to Chairman. Economist in Bureau of Power. Supervising Economist for power market surveys.
On loan to White House to direct study of airline financial problems.

Also: Economist, Bureau of Labor Statistics, author of Bulletin 644.
Economist to Engineering Section, National Research Project (jointly with National Bureau of Economic Research) on energy and technological unemployment.

US NAVY. 1943-7: Destroyer gunnery officer, Fast Carriers.
Reserve Officer, 1947-date. Nuclear Effects Officer in Headquarters War Room at annual NATO Navy exercises.
Member, Naval Reserve Materiels Unit. Naval instructor in Logistics and International Relations. Advisor to Director, Secretary of Navy's Task Force on Retention of Uniformed Military Personnel.

PUBLICATIONS: Competitive Economics of Nuclear and Coal Power (jointly with Caroline J.C. Hellman), 1983, Lexington Books (Lexington, Mass.).
Government Competition in the Electric Utility Industry, 1972, Prager (NYC).
Maximizing Private Risk-Taking in Alternative Energy Sources (jointly with Caroline J.C. Hellman), a Report to and printed by Federal Energy Administration, 1976.

Mrs. LLOYD. Would the full panel like to proceed to the witness table?

Mr. HICKMAN. Madam Chairman, while the panel is assembling, I am here because I am a tax expert. I was in the early seventies the Assistant Secretary of the Treasury for Tax Policy. I wouldn't know where to begin with Mr. Hellman's analysis. It is——

Mrs. LLOYD. I would like to basically——

Mr. HICKMAN. It is so totally off the wall that——

Mrs. LLOYD. I would basically like to have my 5 minutes. I will refer to you, Mr. Katzin, if you would like to comment on Dr. Hellman's—that's right. Mr. Hickman. Please proceed.

Mr. HICKMAN. He has taken it down, but the basic assumption here is that we are selling the equity into the private capital marketplace, and the investment bankers have estimated that at the kind of returns that one needs to get for an equity investment, it would support roughly $150 million. That is a guess. It is a projection based on their judgments as to what the capital markets would provide.

If there were anything approaching $782 million of return, we would have $700 million of equity, so on its face it is all wrong. I mean, if you sold it into the marketplace and you had those numbers, you would obviously get a lot more for it than $150 million. I can——

Mrs. LLOYD. Pardon me, Mr. Hickman. I hate to interrupt you at this point, but I think it would be better, before you begin your presentation, for us to make this vote and then come back and hear you in your entirety.

So we do stand in recess for 10 minutes. Thank you. Since this is first bell, we have had a change of plans. There are two votes, and since this is the first bell, I think that it would be better for you to go ahead. We had a change of signals here. I beg your indulgence. Please proceed.

Mr. HICKMAN. I would be glad to submit an analysis for the record, but I think there is a fundamental misconception that runs through a number of people's approach to the tax benefits.

The plan that we have turns on no particular tax benefits. We could go completely, as Mr. Corey says, without tax benefits and we would still have a plan. The effect of the benefits on the Treasury is zero, they have said in their letter, which I think is the accurate analysis.

While some of these dollars in the way that the tax provisions provide for the distribution of the incentives, which are the incentives available to everybody, the dollars come in early and go back later, so that a lot of the things that happen cash flow wise are reversed at later points. And one has to take that into account as one does the analysis, which has not been done in this kind of case.

In addition to which one also has not just the depreciation benefits, but one has the income stream associated with those benefits. So that has to be taken into account.

When you put all that together, what you have is an estimate by the investment bankers that the net cash flow return in the end will provide a market return of the kind that equity investors normally get. There is no peculiar ripoff or loophole or anything involved here apart from the kinds of things that are generally available to General Motors or United States Steel or any other investor in private plant or equipment.

I would be glad to respond to any particular numbers, but in conclusion, this kind of analysis is just so far off base that we would really have to start from scratch.

The energy tax credit we are not counting on. We do not think, as a professional judgment, it is available——

Mr. **OTTINGER**. Will the gentlelady yield?

Just quickly, are you counting on the research and development tax credit, however, which was not——

Mr. **HICKMAN**. No, we are not. We are counting only on the investment tax credit and the normal accelerated depreciation.

Mr. **HELLMAN**. May I respond for a moment?

Mrs. **LLOYD**. Mr. Hickman has the time. I think we will have general questions when Mr. Hickman gets through.

Mr. **HELLMAN**. But hasn't he talked already? I mean, if he is getting extra time, shouldn't I get extra time?

Mrs. **LLOYD**. He has 2 more minutes left in his time.

Mr. **HELLMAN**. Of his 10?

Mrs. **LLOYD**. He has some more time left.

Mr. **HICKMAN**. I am finished for the moment, I think, unless someone has further questions.

Mrs. **LLOYD**. Mr. Hickman, for the record, would you address the questions from Dr. Hellman's testimony for the record?

Mr. **HICKMAN**. I will.

Mrs. **LLOYD**. That is agreeable. And then we will stand in recess for our votes.

[Recess.]

Mrs. **LLOYD**. The subcommittee will again resume our hearing.

There is certainly nothing to be gained by a biased hearing or a one-sided hearing and in the interest—certainly not what the Chair has in mind in bringing the hearings to this date.

My full intention, and I think it has been, is that we have an open hearing so that both sides can equally present not only their statements, their presentations, but also that all members of the committee—members of the full committee could also have access to the hearings.

And since I do have 10 minutes—2 minutes left of my time for one more question, I would like to ask Dr. Hellman's comments on Mr. Hickman's remarks, so that no one can certainly leave our hearings and say that we have not been fair to everyone.

Mr. **HELLMAN**. Which remark—which particular remark?

Mrs. **LLOYD**. I think that you wanted to respond to Mr. Hickman, and I stated that Mr. Hickman had the time, OK?

Mr. **HELLMAN**. Oh, yeah, right. My point was this——

Mrs. **LLOYD**. We are back to square one, right?

Mr. **HELLMAN**. Yeah, and I was just talking to them about it during the break. The plan is very fuzzy, as I said. And what I think they should have done was made a table such as I made, and then there would have been no question of what they had in mind.

But they did not do that, and what I felt was very strongly was that Mr. Hickman should address himself to my table. And I have given him a copy of the table.

Now remember, I said at the very beginning that I was putting that table up as much to get them to clarify what they do have because they have many contradictions in that report. And I found Mr. Katzin didn't know that certain things were in it during the intermission. So, it is a very complex report. And I do want clarification, and I am perfectly happy to change my numbers.

But again, I come back, they said immediately. It is explained to me now that immediately means present value, but you can't find that in the report as such. They talk about present value in the report, but you can't find that the 15 percent of a billion, which they do mention and which they call immediate, is present value.

Now that is all I am saying. I spent days on this report, working around and around with those ambiguities.

Mrs. LLOYD. Maybe you and Mr. Hickman should have gotten together earlier, Dr. Hellman.

Mr. HELLMAN. You are right.

Mrs. LLOYD. Do you have any further comment, Mr. Hickman, further comment?

Mr. HICKMAN. I think not at this time, Mrs. Lloyd. I will give an analysis for the record.

Mrs. LLOYD. Thank you very much.

[The information follows:]

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September 20, 1983

Louis Ventre, Esq.
Counsel, Subcommittee on
Energy, Research and
Production
House Committee on Science
& Technology
Rayburn House Office Building
Washington, D. C.

Re: Clinch River Breeder Reactor Hearings
September 15, 1983

Dear Mr. Ventre:

At Mr. Frederic Hickman's request, I enclose herewith Mr. Hickman's comments on Dr. Hellman's presentation. Pursuant to Mr. Hickman's undertakings at the September 15 hearings, I request that the enclosed comments be made a part of the record of proceedings before the Subcommittee.

Sincerely yours,

Carl D. Hobelman
Counsel to the BRC Task Force

Enclosure

RESPONSE TO COMMENTS OF
DR. RICHARD HELLMAN

At the subcommittee hearing on September 15, 1983, Dr. Richard Hellman offered figures that purported to show that the equity investors under the proposed financing plan would invest $150 million for an "immediate return" of $368 million and a "total return" of $782 million. At the hearing, I responded that these figures are grossly in error. This memorandum is in response to your request that I supply a written explanation for the record.

Even a casual observation suggests that the Hellman analysis is far off the mark. The essence of the financing plan is the sale of investment interests in the private marketplace at a price determined by the marketplace. The investment bankers represented on the Breeder Reactor Task Force estimate that investors will be willing to invest about $150 million of equity under the circumstances described in the plan. If equity participants could expect a return even remotely resembling that calculated by Dr. Hellman, the market-determined equity participation would be increased several fold over the projected $150 million. Common sense indicates that Dr. Hellman's return figures are irreconcilable with a projected equity investment of $150 million.

Closer examination of Dr. Hellman's analysis reveals several errors, the most glaring of which is his failure to take account of the tax liability associated with Project revenue. Like any other taxpayers who finance an investment with a blend of equity and debt, the equity participants under the Plan will be taxed both on the revenue (if any) they ultimately receive and on the revenue paid over to the bondholders. Therefore, if we assume that Project revenues will be just sufficient to pay the debt service, the equity participants will be taxed on an amount equal to the debt principal of $1.04 billion ($675 million initial borrowing plus $365 million additional borrowing to pay interest during construction) plus the total interest on the principal. Interest paid to bondholders is deductible, leaving a net taxable income stream equal to debt principal ($1.04 billion). Assuming a 46% tax rate, a tax liability of $478.4 million (not discounted to present value) is associated with this taxable income, to be offset by the tax savings associated with the ACRS deductions and the investment credit. Notice that this taxable income stream must be reported on the tax returns of the equity participants even though, under the assumption, every cent of revenue is paid over to bondholders.

A second major error in Dr. Hellman's analysis is a miscalculation of the available deductions and credits. For example, the Project is not expected to be eligible for a 10% energy credit in addition to the 10% regular investment credit. Moreover, interest during construction cannot be treated both as a current deduction and as an addition to the

Project's basis for computing the investment credit and ACRS deductions. If the construction period interest is deducted currently, the Project's cost basis for tax purposes will be $825 million, and the tax benefits (net of interest deductions on permanent bond financing, which simply wash against the portion of taxable revenues in excess of that needed to repay the bond principal) will be as follows:

Investment Tax Credit	$ 82.5 million
Construction Period Interest	167.9 million
ACRS	360.5 million
	$610.9 million*

Subtracting the equity participants' gross tax liabilities of $478.4 million from their gross tax benefits of $610.9 million results in a net tax benefit of $132.5 million. Therefore, it would appear at first blush as though the equity participants invested $150 million and received in return only $132.5 million. However, these figures fail to take account of the fact that the tax benefits are generally received earlier than the corresponding tax liabilities are due. This use of money (or "tax deferral") is one of the principal benefits of the investment tax incentives Congress has provided.

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*As emphasized in the next paragraph of the text, these tax benefit figures, like the $478.4 million figure for gross tax liabilities, are not discounted to present value. The investment tax credit figure was derived by multiplying the total $825 million cost by 10%. The value of the construction period interest deductions was determined by multiplying the $365 deduction by the assumed 46% tax rate, and the value of the ACRS deductions was determined by multiplying the total ACRS deductions of $783.8 (95% of $825) by the assumed 46% tax rate.

After making the corrections in Dr. Hellman's analysis and taking account of the time value of the use of money, the determination of a rate of return on investment will depend upon such variables as the precise amounts and timing of investment, the Project completion date, the estimated tax payment procedures used by particular investors and the discount rate assumptions. A precise rate of return cannot be calculated until the equity participation is actually subjected to the test of the marketplace. In the final analysis, the return on investment will simply be "at the market."

Frederic W. Hickman

Mrs. LLOYD. Mr. Ottinger?

Mr. OTTINGER. I wonder if Mr. Katzin or Mr. Hickman can tell us what the tax benefits will be?

Mr. HICKMAN. The tax benefits will consist of three items. The first is the investment tax credit. The second is the acceleration element in the depreciation deductions; that is, depreciation itself is not a benefit. The benefit comes in the timing.

And the third, which is contingent, is interest during construction, which may or may not be available in this case. If it is available, it will be a deduction at the time the interest is accrued. If it is not available, and this will simply turn on an IRS ruling, if it is not available, then it will increase the capital amount which is eligible for the investment tax credit and accelerated depreciation. And the effect of that is pretty much a wash.

Is that responsive?

Mr. OTTINGER. Mr. Potter was asked in a briefing that he and Mr. Barr gave to staff members what the rate of return to equity investors would be from the tax benefits alone, and he advised that it would be approximately 18 percent after taxes.

Is that a good ballpark figure?

Mr. POTTER. It may be a little low.

Mr. OTTINGER. It may be a little low. What is the estimate?

Mr. POTTER. It could be 20, 21 percent. But the important thing to remember, Mr. Ottinger, is that we are developing an estimate. And if the greater return—if the tax benefits can be solved for less of a rate of return than these numbers work out to be, we would sell them for more value.

Mr. **Ottinger**. Then I—the effect——

Mr. **Corey**. Could I make a comment?

Mr. **Ottinger**. Yes; surely.

Mr. **Corey**. Another way of putting it, Mr. Ottinger, is that the valid question is really what's the market, what's the rate of return that the market requires and the equity participations will be sold on the basis of that rate of return that the market requires. So, if tax benefits are worth more, we will simply increase the equity, and if they are worth less, we will reduce the equity. And the chances are if we get a more favorable tax ruling, we can sell more than 150 million and reduce the revenue bonds.

Mr. **Ottinger**. But I—that rate of return you say, you know, these are just the same as any other investor—these investors are in the same position as any other investor. There isn't any other investor that is guaranteed the completion of the project in which he invests, is there? There isn't any other investor that is assured the changes in the tax code won't affect him.

Mr. **Katzin**. Yes, there are.

Mr. **Ottinger**. There are?

Mr. **Katzin**. This is the conventional way of doing a project financing under the sponsorship of a major corporation, our tax leasing transaction. In both cases there is indemnification against changes in the tax law and there is assurance of completion and operation of the project.

Mr. **Ottinger**. And that kind of financing has been entered into previously by the Federal Government? Not that I am aware of.

Is it expected that the FERC or any State regulatory authority will regulate the rates for sale of the electricity output?

Mr. **Katzin**. I think that is one of the open questions. If it becomes regulated, then we have a 10-year writeoff of depreciation. If it is unregulated, we get the 5 years, and that is one of the issues.

Mr. **Ottinger**. The 18 percent under this plan is virtually guaranteed, is it not? Mr. Corey mentions various kinds of risk that didn't seem to me very real, the risk that a particular taxpayer wouldn't be able to take advantage of the tax benefits. But those aren't real because nobody would invest if he couldn't take advantage, would he?

Mr. **Corey**. Well, I am not sure how anyone can be sure today that one will have taxable earnings in 1995 or 1996. I put in my testimony that really none of us would have realized that some of the major industries in this country would be in the financial trouble they are in today 15 years ago or 20 years ago.

Mr. **Ottinger**. Mr. Hellman said that the tax benefits would be realized in the first 2-plus years. Is that——

Mr. **Corey**. Well, he is just wrong.

Mr. **Ottinger**. How long would it be?

Mr. **Corey**. Well, the depreciation will be realized—if we get 10 years, which is the more likely, will be realized between 1991 and 2001.

Mrs. **Lloyd**. Mrs. Schneider?

Mrs. **Schneider**. Thank you.

I would like to ask Mr. Potter, please, if I wanted to invest in the Clinch River project, could you help me? Did you have to underwrite any of the investment in the Washington Public Power System?

Mr. POTTER. We had several.

Mrs. SCHNEIDER. It was for about three-quarters of a billion, wasn't it?

Mr. POTTER. The single financing for units I, II, and III for which we were the absolute lead underwriter was $750 million.

Mrs. SCHNEIDER. And what was your commission on that?

Mr. POTTER. Well, I did not bring that information. I do have another one done subsequent for $680 million in which we were comanager, and it gives you a good idea of what kind of underwriting discounts there are, and then I would like to go further and say what they are made up of.

Mrs. SCHNEIDER. Well, I will tell you what. Since I only have one shot at questioning and I don't want to monopolize your time, I would appreciate it if you would respond to my inquiries in writing.

Mr. POTTER. Fine.

Mrs. SCHNEIDER. All right, and also including my question as to how your clients are doing.

Mrs. SCHNEIDER. Let me move along and ask a little bit about the tax credits.

Dr. Hellman, can you tell me, are you of the opinion that the investors in this Clinch River project are assuming the same kind of risks insofar as tax credits are concerned as, for example, United States Steel or General Motors?

Mr. HELLMAN. Absolutely not. I would like to come back to one of the statements made. The—you have two periods in which to consider guarantees. One is construction and one is operation.

The equity principle is guaranteed during construction and so is the theoretical profit that would have been realized during construction. Now, I wondered why that guarantee on the theoretical profit stopped with the operation. I am taking that right out of the plan book. The answer is the day the plant goes into operation they start taking accelerated depreciation on the billion or whatever it is.

Mrs. SCHNEIDER. So basically, Mr. Hellman, what you are saying is that if one of the partnership investors—with this partnership investment program what is provided is a floor, that if the Clinch River project fails, the investors are guaranteed a return of their principal, plus interest?

Mr. HELLMAN. If it fails before operation, absolutely.

Mrs. SCHNEIDER. OK.

Mr. HELLMAN. The equity is guaranteed to put the rate of return on the equity.

Mrs. SCHNEIDER. And if the project is successful, however, the partner—partners can make as much as perhaps $780 million?

Mr. HELLMAN. Then they are really in the clover.

Mrs. SCHNEIDER. So in other words——

Mr. HELLMAN. Starting with the first year.

Mrs. SCHNEIDER [continuing]. Heads I win, tails you lose.

Mr. HELLMAN. Absolutely. There is no question of it at all.

Mrs. SCHNEIDER. Taxpayers underwriting of it.

Mr. **Hellman**. I would like to say one thing about the timing. I have seen a briefing paper this thick which is a Government briefing paper. I don't know who originated it, but it gives a time schedule of the input of this money into the project, and it shows that most of it, over 80 percent, goes in the first 3 years; in other words, fiscal years 1984, 1985, and 1986.

That is the basis on which I said they would get the IDC, the interest during construction, which comes to $168 cash value—$168 million cash value—within 2-plus years, because if they started taking it on December 31, they would get that year, plus 2 more years for the other 3 years.

Mrs. **Schneider**. OK. How about elaborating a little bit on the French program, the economics of the French program?

Mr. **Hellman**. I have read the testimony of the French—the nuclear attaché of the embassy. And it is curious because there is not a word in there about economics.

Now, I spent a sabbatical in Paris, and Electricite de France was very cordial in making available to me for the first time I think, they told me, the cost figures. And the cost figures are tremendous and they go to what I was saying about 45 cents to 75 cents. And one of the big factors that has not been mentioned here is that they said to me, there is no way we can measure the fuel costs, and that goes to the breeder ratio.

Mrs. **Schneider**. Are there any other—since I obviously have a couple more seconds left, are there any other points that you wanted to make on some of the statements that were presented earlier?

Mr. **Hellman**. Yes. The plant—or somewhere in the plant is talk of a 1.25 breeder ratio, and the French on the Phenix are only getting 1.14. I think that requires an explanation.

Mrs. **Schneider**. OK.

Mr. **Hellman**. And also requires an elaboration of what the figure is—the break-even point on breeder ratio.

Mrs. **Schneider**. OK. Since I have a little bit of time left, Mr. Potter, if you could summarize your response to about what your commission was on the investment in the WPPSS project. I would appreciate it.

Mr. **Potter**. This will give you an idea of the dimensions involved. I didn't bring the prospectus from that one. We have $680 million of financing, managed by Goldman, Sachs. Solomon Bros. and Merrill Lynch were comanagers. The underwriting discounts totaled over $16 million.

A large—very large share of that is paid to underwriters. There were—in this financing, for example, there were 19 managers and hundreds of other firms participating in the distribution of these securities.

The $16 million will be divided among the hundreds of firms that participate in the distribution of the securities, and a great share of that would be used to pay salesmen that work for those firms to sell the securities.

The management fee for actually writing the document and structuring the financing net of all of our legal and printing, other expenses, is a very, very small fraction of, for example, the——

Mrs. **Lloyd**. The gentlelady's time has expired.

Mr. Walker?

Mr. **Walker**. Thank you, Madam Chairman.

I am interested in knowing from anyone that would feel qualified to respond whether any of you would really recommend to an investor or within your own company putting 10 percent of all the money they had to spend into a project of this type.

That is essentially the position that we are in. As a Congress, we are going to devote 10 percent of all the moneys that we have for R&D to this one project. Is—could you really recommend to investors that you are talking to or to your stockholders that 10 percent of all the money that they have should go into this particular kind of project?

Mr. **Corey**. Mr. Walker, many times over the last 20 years at Commonwealth Edison we have put at least 50 percent of our construction expenditures for the year into our nuclear program, and in most cases that would be split between one or two or three projects going forward.

We are, as you—I don't think you were here when I testified that last year we saved $500 million on our nuclear program, but we have seven nuclear units and five more under construction and we are very happy with it. And yes, we have put a good deal more than 10 percent over a good, long period of time.

Mr. **Walker**. Well, 50 percent—50 percent of shareholder's money or——

Mr. **Corey**. Fifty percent——

Mr. **Walker** [continuing]. Or 50 percent of the money that you raise from ratepayers?

Mr. **Corey**. Fifty percent of construction expenditures. Construction expenditures are never raised from the ratepayers. They are raised generally in proportion from bonds and from the sale of stock, generally in proportion to the capital structure of the company, which is roughly 55 percent debt and 45 percent equity.

Mr. **Walker**. But ultimately repaid, then, by the ratepayers?

Mr. **Corey**. Ultimately recovered hopefully over a 40-year period but——

Mr. **Walker**. But my point is——

Mr. **Corey**. You asked me if we would put as much as 10 percent into one project, and this is—these are enormous figures I am talking about.

Mr. **Walker**. Well, I am talking about looking at a whole scope of the investment possibilities that might be out there for an investor to make at the present time or the scope of possibilities that might be available for a particular company at a time, whether or not 10 percent of everything they have ought to go into a project like Clinch River because that is what we are doing. We have got—the whole realm of energy R&D is where this subcommittee deals, and we would be committing 10 percent of everything we have for the next 5 years or so to this one project.

Mr. **Corey**. I personally feel that 10 percent is conservative.

Mr. **Houthakker**. Well, I think we have to consider what the alternatives are, and I feel that there are more profitable or more promising possibilities than the breeder reactor. I am in favor of spending some research money on the breeder reactor, but not at this rate and not in the form of Clinch River.

There is a great deal to be done in nonbreedering reactors of various kinds. The variety on which we now rely on nuclear power generally, those can be improved and some Government money should go into that.

A lot of money is going into fusion, which may also be excessive and looks like something of a bottomless pit. There are many other energy technologies, ranging from the tar sands and similar technologies to it, solar and wind and water. In light of all this, 10 percent strikes me as out of line.

Mr. WALKER. The debt portion of the plan is essentially the sale of assets of the plant—that is, the revenue—so as to maximize the asset value to the Government. Is that correct, first of all?

Mr. KATZIN. That is correct.

Mr. WALKER. If the risk to the private sector were increased, would the investor demand a higher interest rate and thus reduce the present value of the assets of the project to the Government?

Mr. KATZIN. That is one way of looking at it, but the other way is it may reach a point where it is unsalable. If the risk is too high, no one will buy it, particularly in the large sums of money that we are talking about.

You can raise high-risk money for small projects and technology, but you can't raise $1 billion of high-risk money. There you have to go to the large investing institutions, who apply different and more conservative standards.

Mr. WALKER. Thank you, Madam Chairman.

Mrs. LLOYD. Thank you very much, Mr. Walker.

Mr. Young?

Mr. YOUNG. No, thank you, Madam Chairman.

Mrs. LLOYD. Mr. Brown?

Mr. BROWN. Thank you, Madam Chairman.

I would like to ask a couple of questions of Dr. Houthakker. Am I pronouncing your name correctly?

Did you present your statement? I was absent for a portion of the——

Mr. HOUTHAKKER. Yes, sir, I did present my statement.

Mr. BROWN. I was involved to some degree in the amendment which required some additional participation from the private sector. And while I did not have clearly in mind exactly what it was that would satisfy that requirement, I will confess that it did involve some return to the original understanding in the beginnings of this project for some reasonable proportion of the risk to be shared with the private sector.

I was struck by the statement that you made that this is not responsive to the congressional concern for greater participation. In fact, it does not provide for any meaningful participation. Did you really say that?

Mr. HOUTHAKKER. Yes, sir, I did. What I had in mind was in connection with the bonds, that the risks are exactly the same as those of ordinary Treasury bonds, with one minor qualification that they will not be called ordinary Treasury bonds. They will be called Clinch River bonds or something like this and, therefore, probably demand a slightly higher rate of interest.

But according to the appendix signed by Mr. Corey to the report, any and all risks are being removed from these bonds. It is my feeling that the purchase of Treasury bonds or their equivalent is not private financing.

Mr. **Brown**. Would you agree with the statement that Senator Humphrey made this morning that in effect what this does is make the cost of the project X plus—he said $150 million. In other words, it actually adds to the cost of the project with no additional sharing and risk?

Mr. **Houthakker**. No, I am afraid I did not quite understand what Senator Humphrey was getting at at that point. What I was saying, rather, is that there is no new private money going into this project except for what is covered by tax shelters. Maybe that is what Senator Humphrey was also trying to say, but I did not quite follow him at that stage.

Mr. **Brown**. I was frankly a little surprised at the language that you used. If I had used it, I would have been described as having used inflammatory language, Dr. Houthakker, when you say that this is a "brazen attempt to mislead the Congress and the public and amounts to nothing more than officially sponsored tax evasion."

You sure you want to be that strong about this?

Mr. **Houthakker**. Yes, sir. I am sorry. I don't like to use strong language any more than anybody else. In fact, I would say I generally avoid it.

In this case, though, I really became quite indignant in the first place about the idea that there was some merit in getting this out of the budget. That I think is a complete misconception, a very dangerous misconception. To present this as an advantage of the project struck me, as an economist concerned about our budget deficit, as very questionable.

I also don't like the idea of guaranteeing a tax shelter, which is really what is being done here. Take, for instance, the question of the accelerated depreciation. Some of the gentlemen here have said there is some question whether it will be 5 or 10 years. At the same time, they have also testified and other people have testified that the project may last as long as 50 years.

Well, what is the economic justification of allowing a 30-year project or a 50-year project to be written off in 5 or 10 years? This to my mind is a poor idea, a poor allocation of our resources. And therefore I am suggesting in my statement that using this strong language, that there is not in this report a full discussion of the effect of this plan on the public at large.

Now again, I don't like to use strong language, but I was also influenced by the fact that after all this was not a report by an industry group to the Congress. Such pleas by industry groups are not always taken as the final word. As I understand it, this was a plan developed under Government auspices and at Government expense; in fact, at quite considerable cost.

It seemed to me that in anything that is organized by and paid for by the Government, there has to be a higher standard of public interest perception than I found in this report, and that is one reason why I used those words which you single out.

Mr. **Brown**. Thank you, Dr. Houthakker.

Mrs. **Lloyd**. Mr. Young, I understand that you have a question for the witnesses at this time?

Mr. YOUNG. Yes, Madam Chairman. Thank you very much.

I have a question for Dr. Corey—Mr. Corey.

Mr. COREY. You have just promoted me.

Mr. YOUNG. Would you comment on the Rand report on the CRBR from the perspective of someone seeking investors?

Mr. COREY. In order to save time I would say that when the Rand report was brought out a month or so ago, Joe Swidler and I discussed this. Joe, as you know, was formerly head of the Federal Power Commission. He was head of the New York Public Service Commission under Governor Rockefeller. He was general counsel of the TVA in his early years.

Joe is a sort of elder statesman in the whole public utility regulatory field, and has written a fairly—a fairly lucid response to the Rand report. And I, with your permission, Madam Chairman, I would like to offer it for the record.

[The report follows:]

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July 1, 1983

Honorable Donald Hodel
Secretary, Department of Energy
1000 Independence Avenue, S. W.
Washington, D. C.

Dear Mr. Secretary:

At your meeting yesterday in your offices with representatives of the Breeder Reactor Corporation and other supporters of the Clinch River Breeder Reactor Project, you inquired whether the Breeder Reactor Corporation had prepared a response to the criticisms of the Project which were expressed by President Donald Rice, of the Rand Corporation, in a letter to Senators John Heinz and Gordon Humphrey, published on June 27. You were told that a response was in preparation. Such a document has been completed and a copy is enclosed.

Sincerely,

Joseph C. Swidler

Joseph C. Swidler

JCS/jsr
enclosure
cc: Mr. James J. O'Connor, Chairman
Breeder Reactor Corporation

Mr. Wallace Behnke, President
Breeder Reactor Corporation

MAILING LIST - BLIND CC. JCS' LETTER TO SECY HODEL 7/1/1983

Alex Radin, APPA
Andrew H. Hines, Jr., Florida Power Corp.
John J. Kearney, EEI
Morgan Dubrow, NRECA
Gordon R. Corey, BRC Task Force
Carl D. Hobelman, BRC Task Force
James T. Ramey, Stone & Webster
Thomas R. Kuhn, ANEC
Robert Ginn, Cleveland Electric Illum. Co.
William Young, Burns & Roe, Inc.
John Yasinsky, Westinghouse
John Taylor, EPRI
Robert A. Georgine, Building & Construction Trades, AFL-CIO
Miner H. Warner, Salomon Bros.
John Barr, Morgan Stanley
Fred Potter, Merrill Lynch

July 1, 1983

RESPONSES OF BREEDER REACTOR CORPORATION TO CRITICISMS OF THE CRBR PROJECT BY DONALD RICE, PRESIDENT OF RAND CORPORATION

The Energy Daily for June 27 summarizes a letter from President Donald Rice of Rand Corporation to Senators John Heinz and Gordon J. Humphrey about the Clinch River Breeder Reactor Project (CRBR Project). In the letter, as so summarized, Dr. Rice attacks the Project because of its alleged failure to meet five conditions, all of which are said to be essential to its economic justification. An analysis of the five criticisms demonstrates that Dr. Rice does not understand the basic purpose of the Project and the compelling reasons for continuing with its construction.

The five points made by Rice are listed below (underlined), in paraphrase except where quotation is indicated, with comments following each of them.

1. The high projected growth in electricity demand which was used to justify the CRBR Project has not materialized.

It is true that the rates of growth are now much lower than were projected in 1970. A large part of the reason has been the alarming increase in the price of fossil fuels which began with the OPEC oil embargo of 1973. Properly viewed, the oil price gyrations of the last decade demonstrate the importance of developing domestic energy sources to supplement the fossil fuels. The fact that oil prices have abated in the last year from the maximum levels reached a little earlier has very little to do with the availability and prices which may be expected beyond the next couple of decades, which is the earliest time that breeders could be expected to become commercial sources of power supply.

It goes without saying that the faster the rate of growth in energy use, the more urgent is the problem of finding new (and particularly inexhaustible) energy sources. In looking to the long future, however, a difference in rate of growth is not determinative. If new energy sources do not become necessary in two decades, they will in four or five. Moreover, Dr. Rice rests his argument on a very short blip in the historical trend of electricity demands. He has failed to recognize that electricity is the only energy source that has more than held its own in a period of general decline in energy use. Its market share has grown from year to year. The suggestion is that when the national and world economy improves, electricity will show an accelerating pace of growth.

An additional consideration not referred to by Dr. Rice is that of all energy forms, electricity has the greatest promise for increasing industrial and agricultural productivity and for improving life styles and the standard of living. This country should continue to encourage the avoidance of energy waste, but at the same time it should be encouraging greater use of electricity in ways which will improve productivity and contribute to the quality of life.

2. A precondition for LMFBR is a large and growing light water reactor (LWR) fleet in operation during the 1980s and 1990s, whereas the nuclear industry has taken "a profound and lasting downturn" since 1974.

Here, again, Rice has exhibited a surprising myopia. The question is one of long term energy strategy. Such a strategy cannot be based upon current problems in the licensing of nuclear reactors and in public attitudes toward them, nor should we ignore the sharp swing to nuclear power in France, England, Russia and Japan. There are dynamic and powerful forces at work in this country to rationalize the licensing process and to improve the quality of nuclear design, construction and operation. To assume that these problems will not have been resolved in the next quarter or half century is indeed betting on a failed economy and bankrupt government processes.

3. Uranium prices must be higher than current prices or it will be cheaper in the early 21st century to use uranium in LWR's rather than the plutonium generated by liquid metal fast breeder reactor (LMFBR) plants such as the CRBR.

Here, too, Rice is writing off the breeder on the basis of current conditions, this time on the assumption that the price and availability of uranium at the present time will continue indefinitely into the future. The reference to large uranium finds is overblown at best. Nothing is more certain that that in the ensuing decades, present conditions of supply and price will change drastically, almost certainly in the direction of reduced supply and much higher prices, even after adjustment for inflation.

4. Developing essential reprocessing capacity appears no closer than the breeder itself. "The associated waste disposal, fuel transport, nuclear safety, accountability, and security issues all require demonstrated solutions, currently lacking."

Of all Dr. Rice's objections, this assortment is the strangest. Rice is saying, in effect, that no scientific development work should begin until all potential future problems are solved. On the theoretical level, this is nonsense on its face. There could be no scientific progress if projects could not be started until after all potential problems had been solved; in effect, until the projects had been completed. Beyond theory, Rice ignores decades of progress on each of the items he mentions. Reprocessing, for example, is already a well-developed technology in the U.S., and in several other countries. Each of the other problems Rice mentions is the subject of R,D&D programs which are well along toward assuring that safety of nuclear generation compares favorably with any other power generation technology, either in short-term or long-term potential effects. When the time comes for deployment of commercial breeders, some decades from now, it will become necessary to mandate the kind of safety requirements which are necessary in light of the breeder technology available at that time and the progress of research with respect to all of the safety issues Rice has mentioned.

Rice's reference to the prior need for demonstrating a solution to "security issues" is particularly baffling. Presumably, he means the proliferation problem. This problem is a crucial issue, of worldwide importance. It deserves the most careful attention, in the U.S. and, particularly, on the international level. It is a strain on the imagination, however, to believe that, with the U.S.S.R., France, Great Britain and Japan either already operating breeder reactors or in advanced stages of preparation for building such breeders (all of them, incidentally of the LMFBR type), and with many other countries in earlier stages of work on the breeder, that completion of the CRBR will add to the problem. On the contrary, if the U.S. is to have a voice in world councils on the proliferation problem, it must demonstrate its own scientific nuclear capability to assure admission to these councils.

Finally, and of major significance, is the fact that in one of its possible operating modes, the breeder reactor could act as a plutonium burner and, if we wished, provide an environmentally acceptable method of disposing of plutonium and other long-lived actinides contained in spent fuel.

5. Even if the first four conditions were met, it is not clear that the LMFBR is the most promising breeder technology. The accelerator breeder and the hybrid fusion system might be better.

Rice is proposing that the LMFBR, which has already been tested in small prototypes in this country, should be abandoned after billions of dollars have been spent on successful tests and demonstrations, and after $1-1/2 billion has been invested in the CRBR itself, in order to speculate on the possibility of untried alternatives which present formidable obstacles to success. Every objection Rice has raised to the CRBR would apply equally to the others, and they face additional objections as well. The fusion system, for example, requires dealing with temperatures in the millions of degrees, and has not yet reached the stage where any experiment, even on a laboratory scale, has produced more energy than was required to activate the experiment.

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The Congress has adopted and thus far has largely adhered to a sound long-range energy strategy. That strategy consists of avoiding undue dependence on oil imports, of diversifying energy sources in the interests of minimizing risks, and of pursuing the long-range energy options of high confidence which will provide ample, economical, secure and environmentally acceptable energy sources for future needs. The breeder is a key element of the program. The remaining hydro potential is small; solar will fill a niche, but cannot meet the major energy needs for society's growth; oil is a limited resource, on which we cannot afford to become unduly dependent because a large share must be imported; coal presents formidable environmental problems, of which the present painful concern over "acid rain" is a sharp reminder; and nuclear, too, is based on limited and diminishing quality reserves, except for the breeder. Fortunately, the supply of fissionable material can be multiplied by a factor of sixty by breeding, and the only high confidence breeder technology is the LMFBR, exemplified in its most advanced form by the Clinch River Breeder Reactor. The anti-nuclear lobby has focused on the breeder for the very reason of its enormous potential. The LWR's are more acceptable than the breeder to nuclear opponents because the limits on availability of fissionable source materials of economic quality also limit the future role of non-breeding reactors.

Dr. Rice's paper has ignored the powerful case for the LMFBR, generally, and for the CRBR, in particular, but he declined to criticize the CRBR design, and specifically placed his objections on other grounds. The liquid metal breeder has been the universal choice in other countries for breeder development, and large scale prototypes are in successful operation in the U.S.S.R. and in France. Last year, South Korea became the 8th country to proceed with an advanced breeder reactor program. There is no other technology which can be advocated with confidence as a solution to the problem of providing future generations with a limitless energy supply. As to the CRBR, all major components have been completed and are in storage or are in advanced stages of fabrication, thus lending assurance to both schedule and cost estimates. It incorporates the latest in nuclear technology, including the benefits of the lessons learned from the Brown's Ferry and Three Mile Island accidents.

A billion and a half dollars has already been spent on the CRBR, out of the $4 billion total cost. Of the amount already spent, $150 million was contributed by the nation's electric utilities (public and cooperatives, as well as investor-owned) and other interests, in response to Government pleas for support and the Government's commitment to proceed with the CRBR Project if the outside interests paid the agreed share. The utilities and other interests are committed to an additional contribution of $175 million, including interest, if the project goes forward. In addition, the power output of the Project will support an additional billion dollars of private investment, which would reduce the amount the Government needs to raise to only $1-1/2 billion additional. On the other hand, if the Project is abandoned, the $1-1/2 billion dollars invested in the CRBR goes down the drain, hundreds of millions of dollars more must be spent in cancellation costs and in site restoration, the expenditure of some $5 billion dollars in breeder research and development may be rendered pointless, the United States becomes dependent on other countries for breeder technology, and it exhibits to the world a strange inconstancy for a great world power, and an unwillingness to live up to its commitments. To abandon the CRBR now would signify a major scientific retreat by the United States, which until now has been the world leader in nuclear technology.

Mrs. **Lloyd**. Mr. Corey, I will ask the same things as I have asked the other witnesses. How thick is your report?

Mr. **Corey**. I beg your pardon?

Mrs. **Lloyd**. How thick is your report, since I have asked the other witnesses the same questions? Is it a voluminous report?

Mr. **Corey**. Oh, how thick? It is——

Mrs. **Lloyd**. Well, that is fine. Without objection—without objection it will be included in the record.

Mr. **Young**. Thank you very much, Madam Chairman.

Mrs. **Lloyd**. If there is no further questions—Mr. Young?

Mr. **Young**. No, thank you.

Mrs. **Lloyd**. If I may use the remainder of your time, without objection.

I want to ask Dr. Houthakker a question I am rather confused on. In referring to our tax shelters, is there any difference in what you are referring to as a tax shelter in this financial package than any other tax shelter, which I am rather familiar with, that are certainly within the legal limits of the IRS?

I know that there are many tax shelters in the first year or two that certainly are very advantageous to those in the high-income brackets. Do you also make the same pronouncement on other tax shelters in the same category? Are you in favor of tax shelters or just this one particular tax shelter?

Mr. **Houthakker**. Well, Madam, I must confess that I am not much in favor of tax shelters. Maybe this goes back to the days when I was a consultant to the Office of Tax Analysis in the Treasury and did studies of some of these shelters and it struck me that they are excess. Now, that was in the 1960's, and since then the tax shelters have been multiplied over and over again.

Mrs. **Lloyd**. So you don't—you just don't approve of tax shelters; is that correct?

Mr. **Houthakker**. I don't approve of tax shelter, but I would also say this. The Congress has given these tax shelters sometimes with due consideration, sometimes not. Some of them are slipped into legislation and then they are used by people who were never intended to be the beneficiaries of this. And then at some point Congress, of course, has to take back these tax shelters. Now, in this particular——

Mrs. **Lloyd**. I thank you very much.

Mr. Katzin, would you respond? Is there any difference in this tax shelter and other tax shelters as provided by law?

Mr. **Katzin**. No, there is not.

Mrs. **Lloyd**. This is within the law, as all tax shelters would be?

Mr. **Katzin**. We would propose——

Mrs. **Lloyd**. There is nothing peculiar to this?

Mr. **Katzin**. There is not. We would propose to get a ruling from Treasury, if we can, that it conforms with existing tax law.

Mrs. **Lloyd**. So there are no new incentives that are in this package that are not available to other financial plans?

Mr. **Katzin**. That is correct. There is a group of people who seek tax benefit shelters, and if they don't invest here, they will invest in fast food chains or shopping markets or whatever else they can put their money into.

Mrs. **Lloyd**. Or oil drilling rights?

Mr. **Katzin**. Oil drilling or anything else.

Mrs. **Lloyd**. Thank you very much.

Thank you, gentlemen, for your very excellent testimony. You have been here a long time.

Mr. **Ottinger**. Madam Chairman, I just wondered if I could ask one final thing; that is——

Mrs. **Lloyd**. Without objection.

Mr. **Ottinger** [continuing]. Are we going to be allowed to be equity investors in this project?

Mrs. **Lloyd**. Maybe you would like to be first in line, Mr. Ottinger.

Mr. **Ottinger**. At the market.

Mrs. **Lloyd**. Thank you, gentlemen, for your panel. You have been very patient, and we do appreciate all of you. Very intelligent, very bright, very enlightening.

Mr. **Corey**. Thank you very much.

Mrs. **Lloyd**. I think that we will go next to Mr. Bertrand Barre, nuclear attaché with the Embassy of France.

Mr. Barre has been very patient, and I think he has a plane to catch, and we certainly don't want to delay you. And so Mr. O'Connor has graciously consented to let you go ahead of him.

So we look forward now to your testimony before our committee. We want to tell you how much we do appreciate you being here today, making this exception and appearing before the committee.

We understand that you will only talk about your program, that is correct; I mean, that is the guidelines that you established in coming here. They are not the Chair's guidelines.

STATEMENT OF BERTRAND BARRE, NUCLEAR ATTACHÉ, EMBASSY OF FRANCE

Mr. **Barre**. Thank you very much, Mrs. Chairman.

It is indeed a rare pleasure for a foreign official to appear before this commission. I welcome the opportunity.

My name is Bertrand Barre. I have been the nuclear attaché to the Embassy of France for the last 3 years. My job is to monitor for my Government the many events happening in the field of nuclear energy in your country and also to promote cooperation whenever possible in the same domain.

Before joining the Embassy, I spent 14 years with the French Atomic Energy Commission, where I held a number of positions covering topics from applied physics and reactor engineering to economics, energy policy, and international affairs.

I have submitted a written statement, so I will make oral comments which are not exactly identical.

Mrs. **Lloyd**. Without objection.

Mr. **Barre**. France is a small country by American standards. Our territory is 18 times smaller than yours——

Mrs. **Lloyd**. Excuse me, Mr. Barre.

I think that in all fairness to you that we do need to have a little more quiet in the room.

Thank you very much. You may proceed.

Mr. **Barre**. France is a small country by American standards. Our territory is 18 times smaller than the United States. Our population is about a quarter of yours and we use only one-tenth as much energy as you do. We therefore face an energy problem much more severe than you do, with much fewer natural resources and much less room for conservation.

When the oil shock of 1974 hit us, we had no oil, no gas to speak of, a little very expensive coal, and hydroelectricity had almost reached its maximum capacity. On the other hand, at that time we had a solid body of knowledge in all aspects of nuclear energy, a strong national utility, experience in directing big hydroprojects, and in standardizing its fossil-fueled powerplants. The way to go was obvious and the commitment was massive.

Even as late as 1977 our nine nuclear powerplants in operation generated only 8.4 percent of our electricity. Today, our 35 plants in operation generate 44 percent of our power, and we should be able to reach our target, 70 percent of nuclear electricity, by the end of the decade.

As you can see, we do not view nuclear power as a last resort or a short-lived option, and that in turn explains our dedication to developing the breeder system, which can extend by 80 times the potential of nuclear energy.

Unlike France, the United States have abundant facility resources and a huge potential for conservation. Nevertheless, your only realistic alternatives to increase your electric capacity are coal and nuclear energy.

The two, therefore, seem to me as the goals of reducing foreign imports, of increasing energy security and of alleviating the eventual impact of new energy prices shock should compel the United States, as well as France, to continue with the breeder development.

Soon after the success of EBR I, the first reactor ever to generate electricity, we decided in France that this type of reactor held, indeed, the future of nuclear fission, and we embarked on a development program which has not relented since.

The complexity of the technology involved made it obvious that it was to be a long-term program, continuous, comprehensive and stepwise. To bring it to fruition, several successive goals are to be met: First, finding out about the physics; testing fuel and material in a representative environment; demonstrating the system; scaling up to commercial size; and then approaching economic competitiveness.

Then I will, just in parenthesis—I was told that I didn't include economics in my presentation. I don't think that the role or the step with which Clinch River is concerned is economics. I think it is demonstrating the system. I close the parentheses.

To reach of these goals, a number of facilities had to be built, and I describe them in length in my written statement.

I cannot overemphasize the importance of the continuity factor in our success. There is no way we could have kept together the irreplaceable, experienced teams of researchers and designers without the renewed motivation of a new and more challenging task to perform.

In my written statement I have given a full description of our three breeders: Rapsodie, our test and irradiation facility, which is now shut down; Phenix, the demonstration plant; and Superphenix, which will very soon bring the breeder to full commercial size.

Built in 5 years, within both schedule and budget, Phenix achieved criticality in late August 1973. That is just 10 years ago. The vital statistics of Phenix to date are very impressive. Total electricity production has been more than 11.5 billion kilowatt-hour; availability factor, more than 7—sorry, more than 62 percent; load factor, 55 percent, which amounts to more than 2,000 equivalent days at full power.

The operation of Phenix can be considered as a full success. It has provided an outstanding experience in the field of technological development but also of environmental protection, 85,000 fuel pins have been fully irradiated in Phenix, some of them up to 100,000 megawatt days per ton, and there have been only seven failures of the cladding.

Its actual measured breeding ratio is 1.14, a value which is consistent with the calculations. Its thermal efficiency is 45 percent. It is reliable, easy to operate and maintain, and it submits itself fully to the constraints of an operational grid.

Most amazingly, since 1973 the total accumulated irradiation dose to all operation and maintenance personnel reaches only 65 man rem. I know of no other plant in the world which can even come close to it.

The 1,200-megawatt Superphenix plant, under construction at Creys Malville, is a joint endeavor of France, Italy, and several other European countries, led by West Germany. Its construction started in early 1977; is now almost completed.

Though far more expensive than the PWR of the same size, Superphenix will generate electricity far cheaper than oil-fired plants, and it will break even roughly with coal. Commercial operation should begin in the second half of 1984, about 1 year later than predicted in the original schedule.

But already Superphenix has demonstrated a very important fact. International cooperation is possible on such projects. Indeed, this cooperation has been successful enough to induce the British into announcing last week their intent to join the European effort, as you probably know.

You will notice that each step has been scaled up from the previous one and committed only after the latter's operation has proven successful. We intend to keep the same approach.

Electricite de France, the Commissariat a l'Energie Atomique and Novatome are presently preparing the detailed design of a 1,500 megawatt breeder, which could be ordered as soon as 1985 or 1986, if Superphenix starts successfully and also if the government decides this timing fits into the general economic and energy picture than prevailing. As a matter of fact, EDF formally commissioned a study on July 4 this year.

By identifying the French program as "comprehensive," I meant to stress that it fully incorporates all the elements of the fuel cycle because breeders make sense only if their cycle is closed and if plutonium recycle does occur.

The ATPU facility Cadarache has by now manufactured more than 11 metric tons of plutonium as mixed oxide, the Rapsodie fuel has been recycled totally at least three times, and Phenix runs entirely on its own recycled plutonium.

More than 12 metric tons of FBR fuel have been reprocessed to date in France. Furthermore—and this is a world premier—the high-level wastes coming from the reprocessing of the Phenix fuel has been vitrified in Marcoule after a very short cooling time.

By "comprehensive" I also mean that the safety R&D and licensing studies have kept pace with the rest of the program, but what I do not mean is we do not develop a broad range of alternative solutions for each and every problem. Quite to the contrary, we have developed only one solution with very few variations around the theme.

But as fascinating as the French breeder program is, the real star of today's show is Clinch River. The question is, should you or should you not complete it?

My answer is an absolute "Yes." Based not upon such technical niceties of the design, but upon my firm belief, based on our experience, that there is simply no substitute to building demonstration plants, no matter how comprehensive your R&D program is.

The body of knowledge piling up in the R&D laboratories, once acquired, remains available even when the researchers have turned to other studies. It is not so for the engineering and manufacturing know-how borne out of actual realization.

Good engineering teams are perishable goods that you keep fresh only by having them work on lively projects. Even though you landed man on the Moon in 1969, I doubt NASA would still be in existence were it not for the space shuttle program.

Then you have the attraction of actual daily operation. When demonstration plants operate, they generate power, and when they are down, they generate knowledge, and knowledge generated by incidents in actual plants is not available anywhere else.

I have tried in my paper to underline how incidents regarding Phenix have brought up some really invaluable demonstration; demonstration that competence of the primary circuit can, if need be, to remove the contaminated, repaired, and put back into place without any problem, even after several years of operation and without radiating the personnel.

More recently, the demonstration that steam sodium reaction can be routinely handled. You would need very elaborate experiments, indeed, to be convincing to that degree. Needless to say that the experience gained has also been implemented in the design and operational properties of Superphenix.

You might, of course, ask, "Well, if Phenix is so successful, why should we need"—I mean you—"another demonstration plant in the United States?" That is yours to decide, but I could ask you another question. "If we had not built Rapsodie just because EBR-2 was already available in the United States, where would we be today?"

For my conclusion I will go back to the strategic vision which supports the breeder development.

Mrs. LLOYD. Excuse me, Mr. Barre. Would you mind condensing the remaining part of your time since we have asked——

Mr. BARRE. The uranium part is just a conclusion.

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Nowadays, three technologies seem to offer on the long term the potential for practically unlimited supply of energy: the breeder, nuclear fusion and solar energy. But as agreed by the heads of the industrial states at the Williamsburg summit, the breeder is by far the most advanced in development. It is also, if I may add, the cheapest, though not yet competitive.

Bringing the breeder system to full competitivity represents a major challenge. I think the world needs a U.S. breeder program, as yourselves needs a European and Japanese program. If you give up, I don't think that will doom the breeder programs elsewhere in the world, but we will certainly miss you.

Thank you.

[The prepared statement of Mr. Barre follows:]

AMBASSADE DE FRANCE
AUX ETATS UNIS

L'ATTACHÉ NUCLÉAIRE

THE DEVELOPMENT OF FAST BREEDER REACTORS IN FRANCE

TESTIMONY SUBMITTED BEFORE THE HOUSE SUBCOMMITTEE ON
ENERGY RESEARCH AND PRODUCTION - SEPTEMBER 15, 1983

STRATEGIC PLANNING IS WORTHLESS, UNLESS THERE IS FIRST
A STRATEGIC VISION - JOHN NAISBITT (MEGATRENDS)

SUITE 610, 1820 N STREET N.W., WASHINGTON, D.C. 20036 - (202) 785-1833 - TELEX: WU164187 CABLE: FRATENBERG WASHINGTON

BEFORE DESCRIBING IN DETAILS THE FRENCH FBR DEVELOPMENT PROGRAM, I WOULD LIKE TO DRAW A QUICK SKETCH OF THE OVERALL ENERGY PICTURE IN FRANCE, AND TO DEPICT OUR NUCLEAR ENERGY PROGRAM IN GENERAL.

1. NUCLEAR ENERGY IN FRANCE

FRANCE IS A SMALL COUNTRY BY AMERICAN STANDARDS : OUR TERRITORY IS EIGHTEEN TIMES SMALLER THAN THE UNITED STATES, OUR POPULATION IS ABOUT A QUARTER OF YOURS, AND WE USE ONLY ONE TENTH OF THE AMERICAN ENERGY CONSUMPTION. AS THOSE FIGURES IMPLY, WE FACE AN ENERGY PROBLEM MORE SEVERE THAN YOU DO, WITH MUCH LESS NATURAL RESOURCES, AND MUCH LESS ROOM FOR CONSERVATION. WHEN THE OIL SHOCK OF 74 HIT US, WE HAD NO OIL, NO GAS TO SPEAK OF, A LITTLE COAL, BUT VERY EXPENSIVE, AND HYDROELECTRICITY HAD ALMOST REACHED ITS MAXIMUM CAPACITY. ON THE OTHER HAND, WE HAD A SOLID BODY OF KNOWLEDGE IN ALL ASPECTS OF NUCLEAR ENERGY, AND A STRONG NATIONAL UTILITY, EXPERIENCED IN DIRECTING BIG HYDRO PROJECTS AND STANDARDIZING ITS FOSSIL FUELED POWER PLANTS. THE WAY TO GO WAS OBVIOUS, AND THE COMMITTMENT WAS MASSIVE.

EVEN AS LATE AS 1977, OUR 9 NUCLEAR POWER PLANTS IN OPERATION GENERATED ONLY 8.4 % OF OUR ELECTRICITY. TODAY, OUR 35 PLANTS IN OPERATION GENERATE 44 % OF OUR POWER AND IT REALLY LOOKS AS IF WE ARE GOING TO REACH OUR TARGET - 70 % OF NUCLEAR ELECTRICITY - BY THE END OF THE DECADE (SEE FIG. 1).

IN HIS OFTEN QUOTED BOOK "MEGATRENDS", JOHN NAISBITT WRITES :

.../...

"

STRATEGIC PLANNING IS WORTHLESS - UNLESS THERE IS FIRST A STRATEGIC VISION - A STRATEGIC VISION IS A CLEAR IMAGE OF WHAT YOU WANT TO ACHIEVE, WHICH THEN ORGANIZES AND INSTRUCTS EVERY STEP TOWARD THAT GOAL.

"

HE THEN EXEMPLIFIES HIS IDEAS BY USING THE EXAMPLE OF NASA :

"

CONTRAST THE ORGANIZING FOCUS OF PUTTING A MAN ON THE MOON BY THE END OF THE DECADE WITH "WE ARE GOING TO BE THE WORLD LEADER IN SPACE EXPLORATION", WHICH DOESN'T ORGANIZE ANYTHING.

"

A FERVENT ADMIRER OF YOUR SPACE PROGRAM, I COMPLETELY AGREE WITH THAT THOUGHT, AND WITH THAT EXAMPLE. I FURTHER SUBMIT THAT OUR NUCLEAR PROGRAM TOO QUALIFIES AS A "STRATEGIC VISION" WHICH MAY ACCOUNT FOR ITS SUCCESS. ON A MORE MODEST SCALE, SO DOES OUR BREEDER PROGRAM.

2. THE BREEDER : A STRATEGIC VISION

SOON AFTER THE SUCCESS OF YOUR EXPERIMENTAL BREEDER NUMBER 1, THE FIRST REACTOR EVER TO GENERATE ELECTRICITY, WE DECIDED IN FRANCE THAT THIS TYPE OF REACTOR HELD, INDEED, THE FUTURE OF NUCLEAR FISSION, AND WE EMBARKED ON A DEVELOPMENT PROGRAM WHICH HAS NOT RELENTED SINCE. FOR A COUNTRY WHOSE MAIN INCENTIVE TO DEVELOPING NUCLEAR ENERGY IS THE REDUCTION OF THE DEPENDENCE ON FOREIGN IMPORTS, THE HOPE OF EXTRACTING MOST OF THE ENERGY CONTENT FROM THE URANIUM, INSTEAD OF A MERE ONE PERCENT, WAS, AND STILL IS, ALMOST IRRESISTIBLE.

.../...

THE COMPLEXITY OF THE TECHNOLOGY INVOLVED MADE IT OBVIOUS THAT IT WAS TO BE A LONG TERM PROGRAM, CONTINUOUS, COMPREHENSIVE AND STEPWISE. TO BRING IT TO FRUITION, SEVERAL SUCCESSIVE GOALS HAD TO BE MET, AS SHOWN BELOW :

GOAL	PERIOD OF TIME	FACILITIES
FINDING OUT ABOUT THE PHYSICS	1953-67	SODIUM LOOPS CRITICAL ASSEMBLIES (PROSERPINE, MASURCA)
TESTING FUEL AND MATERIAL IN A REPRESENTATIVE ENVIRONMENT	1961-73	RAPSODIE (24-40 MWT) ATPU - CADARACHE AT1 - LA HAGUE
DEMONSTRATING THE "SYSTEM"	1968-84	PHENIX (250 MWE) SAP MARCOULE
SCALING-UP TO COMMERCIAL SIZE	1975-..	SUPERPHENIX TOR MARCOULE NEW ATPU
APPROACHING ECONOMIC COMPETITIVENESS	1980-..	1500 MWE PURR

AS YOU CAN SEE, THIS WELL DEFINED SERIES OF GOALS TO BE MET HAS RESULTED IN A WELL FOCUSED PROGRAM, AND A STRONG MOTIVATION FOR THE PARTICIPANTS. LET ME HASTEN TO SAY THAT, GIVEN THE LIMITED AMOUNT OF RESOURCES AND MONEY WE COULD DEVOTE TO FBR DEVELOPMENT, WE MADE A VIRTUE OF WHAT WAS A NECESSITY. LATE STARTERS, WE COULD ALSO TAKE ADVANTAGE OF YOUR PAST EXPERIENCE, AND PICK A FEW KEY OPTIONS AMONG THE MANY ALTERNATIVES PIONEERED IN THIS COUNTRY :

.../...

LIQUID SODIUM COOLING, MIXED OXYDE FUEL, POOL DESIGN, ETC.. BUT OUR SPECIFIC MERIT WAS TO USE YOUR EXPERIENCE TO SET UP A VISION, AND BUILD AN ARTICULATE PROGRAM TO FULFILL IT SOME DAY.

I CANNOT OVER-EMPHASIZE THE IMPORTANCE OF THE CONTINUITY FACTOR IN OUR SUCCESS : THERE IS NO WAY WE COULD HAVE KEPT TOGETHER THOSE IRREPLACEABLE EXPERIENCED TEAMS OF RESEARCHERS AND DESIGNERS WITHOUT THE RENEWED MOTIVATION OF A NEW AND MORE CHALLENGING TASK TO PERFORM.

3. MILESTONES IN FBR DEVELOPMENT

AS SHOWN ON FIGURE 2, FBR DEVELOPMENT IN FRANCE IS MARKED BY 3 MILESTONES :

REACTOR	POWER	BEGIN CONSTRUCTION	BEGIN OPERATION	SHUTDOWN
RAPSODIE	24-40 MWT	1961	1967	1983
PHENIX	250 MWE	1968	1973	-
SUPERPHENIX	1200 MWE	1977	1984	-

RAPSODIE, OUR FIRST "TRUE" FBR, WAS BUILT IN CADARACHE BETWEEN 1961 AND 1966. THIS TEST AND IRRADIATION REACTOR STARTED IN 67 WITH A THERMAL OUTPUT OF 20 MW, UPGRADED LATER TO 24, THEN 40 MW.

IT HAS PROVEN AN INVALUABLE TOOL FOR COMPONENT TESTING IN ACTIVE CONDITIONS, THEN FOR FUEL AND MATERIALS IRRADIATION. FOR INSTANCE, IN 1981, A BURN-UP OF 220,000 MWD/T OR 27 % WAS REACHED ON A FUEL PIN (WHEN STANDARD MAXIMUM BURN-UP FOR LWR FUELS IS 33,000 MWD/T).

.../...

RAPSODIE HAS BEEN VERY RELIABLE : FROM 67 TO THE END OF 81, ITS AVERAGE AVAILABILITY FACTOR HAS BEEN 73.5 %, AND ITS AVERAGE LOAD FACTOR, 54.4 %. AT THE BEGINNING OF LAST YEAR, A NITROGEN LEAK WAS DETECTED AND LOCATED. IT WAS DECIDED THAT, OWING TO ITS AGE, RAPSODIE WAS NOT WORTH REPAIRING, AND IT WAS SHUT DOWN. IN THE FIRST SEMESTER OF 1983, WE HAVE CARRIED OUT IN RAPSODIE A SERIES OF VERY VALUABLE END-OF-LIFE EXPERIMENTS, OPERATING THE REACTOR AND/OR THE FUEL BEYOND NORMAL PARAMETERS. WE NOW EXPECT TO LEARN A LOT FROM ITS DECOMMISSIONING.

AS SOON AS 1965, DESIGN OF A 250 MWE,POOL·TYPE,BREEDER REACTOR WAS UNDERWAY. AT THE END OF 68, AFTER MORE THAN ONE YEAR OF SUCCESSFUL OPERATION OF RAPSODIE, CONSTRUCTION OF PHENIX BEGAN AT MARCOULE, ON THE RHONE RIVER.

BUILT IN FIVE YEARS, WITHIN BOTH SCHEDULE AND BUDGET, PHENIX ACHIEVED CRITICALITY IN LATE AUGUST 73, AND WAS PUT INTO COMMERCIAL OPERATION BY JULY 1974.

THE "VITAL STATISTICS" OF PHENIX TO THE END OF JULY 83, ARE VERY IMPRESSIVE :

TOTAL ELECTRICITY PRODUCTION : 11.5 BILLIONS KWH (GROSS)
AVAILABILITY FACTOR SINCE JULY 74 : 62.2 %
LOAD FACTOR SINCE JULY 74 : 57.1 %
EQUIVALENT DAYS AT FULL POWER : 1980 EFPD
MAXIMUM SUBASSEMBLY BURN-UP : 100,000 MWD/T

AS OF TODAY, THE OPERATION OF PHENIX CAN BE CONSIDERED AS A FULL SUCCESS, AND IT HAS, INDEED, BEEN A "DEMONSTRATION PLANT". IT HAS PROVIDED AN OUTSTANDING EXPERIENCE IN THE FIELDS OF TECHNOLOGICAL DEVELOPMENT, BUT ALSO OF ENVIRONMENTAL PROTECTION : 85,000 FUEL PINS HAVE BEEN FULLY IRRADIATED IN PHENIX, SOME OF THEM UP TO 100,000 MWD/T, AND THERE HAVE BEEN ONLY SEVEN FAILURES OF THE CLADDING, MOST OF WHICH OCCURED ON PINS IRRADIATED BEYOND NOMINAL DESIGN.

.../...

ITS ACTUAL MEASURED BREEDING RATION IS 1.14, VALUE CONSISTANT WITH THE CALCULATIONS. ITS THERMAL EFFICIENCY IS 44 %, OR EVEN 45 % IF WE TAKE INTO ACCOUNT ITS SUPPLY OF PROCESS STEAM TO THE CENTER OF MARCOULE - AS PHÉNIX HAS BEEN CO-GENERATING FOR YEARS. THIS MEANS THAT ITS THERMAL RELEASES ARE EVEN LOWER THAN THOSE OF A COAL FIRED PLANT OF SIMILAR CAPACITY. IT IS RELIABLE, EASY TO OPERATE AND MAINTAIN, AND SUBMITS ITSELF FULLY TO THE CONTRAINTS OF AN OPERATIONAL GRID. IT HAS NO LIQUID EFFLUENT, AND ITS GASEOUS RELEASES ARE JUST ABOVE THE MEASURED BACKGROUND (HALF A CURIE PER DAY). MOST AMAZINGLY, SINCE 73, TOTAL CUMULATED IRRADIATION DOSES TO ALL OPERATION AND MAINTENANCE PERSONNEL REACHES ONLY 65 MAN X REM (FIGURE 3). I KNOW OF NO OTHER POWER PLANT IN THE WORLD WHICH COMES EVEN CLOSE TO IT. *(It comes to ~ 30 man x rem/GWe/yr, versus 1200-1600 for LWRs).*

PHÉNIX HAVING SUCCESSFULLY PLAYED ITS ROLE OF DEMONSTRATION, THE NEXT STEP WAS TO DESIGN AND BUILD A PROTOTYPE PLANT OF A SIZE MATCHING PRESENT LWRS. THE 1200 MWE SUPERPHÉNIX PLANT, UNDER CONSTRUCTION AT CREYS MALVILLE, IS THIS DECISIVE STEP IN THE DEVELOPMENT OF FBRS. IT IS A JOINT ENDEAVOUR OF FRANCE (51 %), ITALY (33 %) AND SEVERAL OTHER EUROPEAN COUNTRIES LED BY THE FRG. ALMOST A STRAIGHTFORWARD EXTRAPOLATION OF PHÉNIX, SUPERPHÉNIX IS A MULTINATIONAL PLANT. ITS CONSTRUCTION, STARTED IN EARLY 1977, IS NOW ALMOST COMPLETED.

COMMERCIAL OPERATION SHOULD BEGIN IN THE SECOND HALF OF 1984, ABOUT ONE YEAR LATER THAN PREDICTED IN THE ORIGINAL SCHEDULE. FOR SUCH AN ADVANCED PROTOTYPE, SEVEN AND A HALF YEARS FROM THE FIRST CONCRETE TO THE FIRST KILOWATTHOUR COMPARE FAVORABLY TO MANY CONSTRUCTION TIMES OF THE CONVENTIONAL NUCLEAR REACTORS, THROUGHOUT THE WORLD. AS OF TODAY, SUPERPHÉNIX HAS ALREADY DEMONSTRATED A VERY IMPORTANT FACT : INTERNATIONAL COOPERATION IS INDEED POSSIBLE ON SUCH PROJECTS.

EACH "STEP" HAS BEEN SCALED UP FROM THE PREVIOUS ONE, AND COMMITTED ONLY AFTER THE LATTER'S OPERATION HAD PROVEN SUCCESSFUL.

.../...

Electricite de France, the Commissariat a l'Energie Atomique and Novatome are presently preparing the detailed design of a 1500 MWe breeder, which could be ordered as soon as 85-86, if Superphenix starts successfully, and if the government decides this timing fits into the general economic and energy picture then prevailing. (Figure 4)

4. Around the reactors

By identifying the French program as "comprehensive" I meant to stress that it fully incorporates all the elements of the FBR fuel cycle, because breeders "make sense" only if their cycle is "closed" and if plutonium recycle does occur.

Plutonium fuel fabrication is carried out in the "Atpu" facility in Cadarache whose size has grown in parallel with the size of the reactors themselves. The first core of Rapsodie was delivered in 66, the first core of Phenix, in 73, and the first core of Superphenix is almost ready today. Cadarache has by now manufactured more than 11 metric tons of plutonium as mixed oxyde, and it is capable of manufacturing the fuel for the next two big plants to be ordered some day ...

The reprocessing has also been demonstrated at corresponding scale ; the Rapsodie fuel has been recycled totally at least three times, owing to the reprocessing facility AT1 in La Hague, now decommissioned. The Phenix fuel is reprocessed partly in the Marcoule SAP pilot, partly during some specific campaign in the UP2 LWR reprocessing plant in La Hague. In 1984, a new facility, TOR, will be commissioned for this purpose in Marcoule to process all the fuel from Phenix and KNK2, the German FBR. More than 12 metric tons of FBR fuel have been reprocessed to date in France.

.../...

FURTHERMORE, AND THAT IS A "WORLD PREMIERE", THE HIGH LEVEL WASTES COMING FROM THE REPROCESSING OF THE PHENIX FUEL HAVE BEEN VITRIFIED IN MARCOULE, AFTER A VERY SHORT COOLING TIME.

BY "COMPREHENSIVE", I ALSO MEAN THAT THE SAFETY R & D AND LICENSING STUDIES HAVE KEPT PACE WITH THE REST OF THE PROGRAM. MOST OF THE SAFETY EXPERIMENTS ARE CARRIED OUT IN AN INTERNATIONAL FRAMEWORK, MANY OF THEM IN COLLABORATION WITH THE UNITED STATES.

MOST EXPERTS NOW AGREE - AS WAS VERY CLEAR IN THE LYON INTERNATIONAL MEETING OF JULY 82 - THAT THE SAFETY OF BREEDERS IS AT LEAST EQUAL TO THE SAFETY OF THE "CLASSICAL" REACTORS.EVEN THOUGH LIQUID SODIUM HAS A NASTY CHEMICAL AFFINITY FOR OXYGEN AND WATER, IT IS USED WITHOUT PRESSURE AND VERY FAR FROM ITS BOILING POINT, AND THE HIGH THERMAL INERTIA OF THE COOLANT IS A TRADE OFF FOR THE NEGATIVE VOID COEFFICIENT.

TO BE COMPLETE , I MUST ALSO UNDERLINE WHAT I DO NOT MEAN BY "COMPREHENSIVE". WE HAVE NOT DEVELOPED A BROAD RANGE OF ALTERNATIVE SOLUTIONS FOR EVERY PROBLEM ; QUITE TO THE CONTRARY, WE HAVE DEVELOPED ONE SOLUTION WHICH WORKS, WITH VERY FEW VARIATIONS AROUND THE THEME.

GIVEN OUR LIMITED RESOURCES IN BOTH BUDGET AND MANPOWER, WE WOULD HAVE SPREAD OURSELVES THIN TRYING TO DO OTHERWISE.FURTHERMORE, WE DO NOT EXIST IN A VACUUM ; SHOULD ONE OF OUR CHOICES OF DESIGN OR MATERIAL PROVE TO BE LESS THAN OPTIMAL, WE KNOW WE CAN RELY ON ALTERNATIVES DEVELOPPED IN THIS COUNTRY OR ELSEWHERE IN EUROPE. OUR PROGRAM NEEDS YOURS, AND I AM CONVINCED THE REVERSE IS TRUE.

.../...

5. FOCUS ON PHENIX : THE KEY ROLE OF A DEMONSTRATION FACILITY

FASCINATING AS THE FRENCH BREEDER PROGRAM IS, THE REAL STAR OF TODAY'S SHOW IS THE CLINCH RIVER BREEDER PROJECT : SHOULD YOU OR SHOULD YOU NOT COMPLETE IT ?

MY ANSWER IS AN ABSOLUTE YES, BASED NOT UPON SUCH OR SUCH TECHNICAL NICETY OF THE DESIGN, BUT UPON MY FIRM BELIEF THAT THERE IS SIMPLY NO SUBSTITUTE TO BUILDING DEMONSTRATION PLANTS, NO MATTER HOW LARGE A "BASE PROGRAM" YOU CAN SUPPORT.

TO BE SUCCESSFUL, A REACTOR SYSTEM DEVELOPMENT MUST STAND ON THREE LEGS : A RESEARCH AND DEVELOPMENT PROGRAM, THE EXPERIENCE GAINED IN THE DESIGN, ENGINEERING AND MANUFACTURE OF ACTUAL COMPONENTS, AND THE TOUCHSTONE OF ACTUAL DAILY OPERATION. BUT THOSE LEGS ARE NOT FULLY SYMETRICAL : THE BODY OF KNOWLEDGE PILING UP IN THE R & D LABORATORIES, ONCE ACQUIRED, REMAINS AVAILABLE EVEN WHEN THE RESEARCHERS HAVE TURNED TO OTHER STUDIES. IT IS NOT SO FOR THE ENGINEERING AND MANUFACTURING KNOWHOW, BORN ONLY OUT OF ACTUAL REALIZATION. GOOD ENGINEERING TEAMS ARE PERISHABLE GOODS, THAT YOU KEEP FRESH ONLY BY HAVING THEM WORK ON LIVELY PROJECTS. EVEN THOUGH YOU LANDED MAN ON THE MOON IN 1969, WOULD NASA STILL EXIST, WERE IT NOT FOR THE SPACE SHUTTLE PROGRAM ?

LOOK AT IT THIS WAY : WHEN DEMONSTRATION PLANTS OPERATE, THEY GENERATE POWER, AND WHEN THEY ARE DOWN, THEY GENERATE KNOWLEDGE. AND THE KNOWLEDGE GENERATED BY INCIDENTS IN ACTUAL PLANTS IS NOT AVAILABLE ANYWHERE ELSE. LET ME TAKE AS AN EXAMPLE THE TEN YEARS OF OPERATION OF PHÉNIX, OUR DEMONSTRATION PLANT. YOU CAN SPLIT THEN INTO VERY DISTINCT PHASES, AS ILLUSTRATED BY THE LOAD FACTOR OF THE PLANT.

.../...

YEAR	LOAD FACTOR	PHASE	COMMENT
1974	76.9	1	VERY SUCCESSFUL START-UP AND EARLY OPERATION
1975	64.1		
1976	47.1	2	TROUBLES WITH AND REPAIRS OF THE IHX
1977	15.5		
1978	60.9	3	VERY SUCCESSFUL OPERATION, INCLUDING EXTENDED MAINTENANCE
1979	84.8		
1980	64.9		
1981	70.5		
1982	49.5	4	STEAM GENERATOR LEAKS AND REPAIRS
1/2 HALF 83	40.0		

PERIODS OF VERY RELIABLE OPERATION WERE INTERRUPTED BY TWO PROBLEM-PERIODS. FIRST, SODIUM LEAKS DUE TO THERMAL CYCLING STRESSES HAVE PLAGUED THE INTERMEDIATE HEAT EXCHANGERS IN 1976, AND SIGNIFICANTLY REDUCED TO POWER OUTPUT FOR TWO YEARS. BUT THIS HAS SERVED AS A DEMONSTRATION THAT COMPONENTS OF THE PRIMARY CIRCUIT CAN, IF NEED BE, BE REMOVED, DECONTAMINATED, REPAIRED, AND PUT BACK INTO PLACE WITHOUT ANY PROBLEM, EVEN AFTER SEVERAL YEARS OF OPERATION, AND WITHOUT IRRADIATING THE PERSONEL. IN ADDITION, THE DESIGN OF THE SUPERPHENIX IHX WAS DULY MODIFIED TO INCORPORATE THE LESSONS LEARNED FROM THIS INCIDENT.

IN THE FOLLOWING FOUR YEARS, PHENIX OPERATED SO WELL THAT IT ALMOST LOOKED AS IF NOTHING WAS LEFT TO BE LEARNED FROM ITS OPERATION - THOUGH IT WAS STILL INVALUABLE AS A FUEL TESTING FACILITY.

.../...

THEN, TWICE IN 1982, AND ONCE MORE IN FEBRUARY 83, A NEW KIND OF INCIDENT OCCURRED ; THE KIND WHICH WAS MOST DREADED BY FBR OPERATORS : A SODIUM-WATER REACTION IN THE STEAM GENERATORS. EVERYTIME, EARLY WARNING WAS GIVEN BY THE HYDROGEN DETECTION SYSTEM, AND THE REACTOR WAS SAFELY SHUT WITHOUT ANY FURTHER DAMAGE.

BY NOW, WE HAVE UNDERSTOOD THE MECHANISM LEADING ULTIMATELY TO THOSE LEAKAGES, COMPLETELY REPAIRED THE REHEATER SECTIONS OF ALL THREE STEAM-GENERATORS, AND PHENIX HAS BEEN BACK TO FULL POWER SINCE AUGUST 15TH. CORRECTIONS WILL BE MADE BOTH IN PHENIX AND SUPERPHENIX TO SOME PROCEDURES FOR RUNNING THE PLANTS AT LOW POWER LEVEL ; BUT, MORE IMPORTANTLY, WE KNOW HOW THAT STEAM/SODIUM REACTIONS CAN BE ROUTINELY HANDLED. YOU WOULD NEED A VERY ELABORATE EXPERIMENT, INDEED, TO BE CONVINCING TO THAT DEGREE !

WE LOOK FORWARD NOW FOR ANOTHER PERIOD OF UNEVENTFULL OPERATION, UNTIL A NEW INCIDENT BRINGS US NEW KNOWLEDGE - BUT NOT TOO SOON IF POSSIBLE.

* * *

YOU MIGHT ASK, OF COURSE : "IF PHENIX IS SO SUCCESSFUL, WHY SHOULD WE NEED ANOTHER DEMONSTRATION PLANT IN THE UNITED STATES ?", AND I WOULD JUST ANSWER BY ANOTHER QUESTION "IF WE HAD NOT BUILT RAPSODIE, BECAUSE EBR-2 WAS ALREADY UNDERWAY, WHERE WOULD WE BE TODAY ?

6. BY WAY OF CONCLUSION

FOR MY CONCLUSION, I WILL GO BACK TO THE "STRATEGIC VISION" WHICH SUPPORTS THE BREEDER DEVELOPMENT :

.../...

NOWADAYS, THREE TECHNOLOGIES SEEM TO OFFER ON THE LONG TERM THE POTENTIAL FOR PRACTICALLY UNLIMITED SUPPLY OF ENERGY : THE BREEDER, NUCLEAR FUSION, AND SOLAR ENERGY, BUT, AS WAS UNDERLINED IN THE EXPERTS REPORT ON TECHNOLOGY AND EMPLOYMENT SUBMITTED TO, AND APPROVED BY, THE HEADS OF THE INDUSTRIAL STATES AT THE WILLIAMSBURG SUMMIT, THE BREEDER IS BY FAR THE MOST ADVANCED IN DEVELOPMENT. HOWEVER, DEVELOPING A FULLY COMPETITIVE BREEDER SYSTEM REMAINS A MAJOR CHALLENGE . THE WORLD NEEDS THE U.S. BREEDER PROGRAM, AS YOURSELVES NEED THE EUROPEAN AND JAPANESE PROGRAMS TO BE REALLY CONFIDENT THAT URANIUM WILL BE ABLE TO MEET THE WORLD ENERGY NEEDS FOR CENTURIES. IF THE UNITED STATES GAVE UP, I DO NOT THINK THAT IT WOULD DOOM THE BREEDER PROGRAMS ELSEWHERE IN THE WORLD, BUT WE WOULD CERTAINLY MISS YOU.

FIGURE 1

Nuclear Facilities in France - 8/83

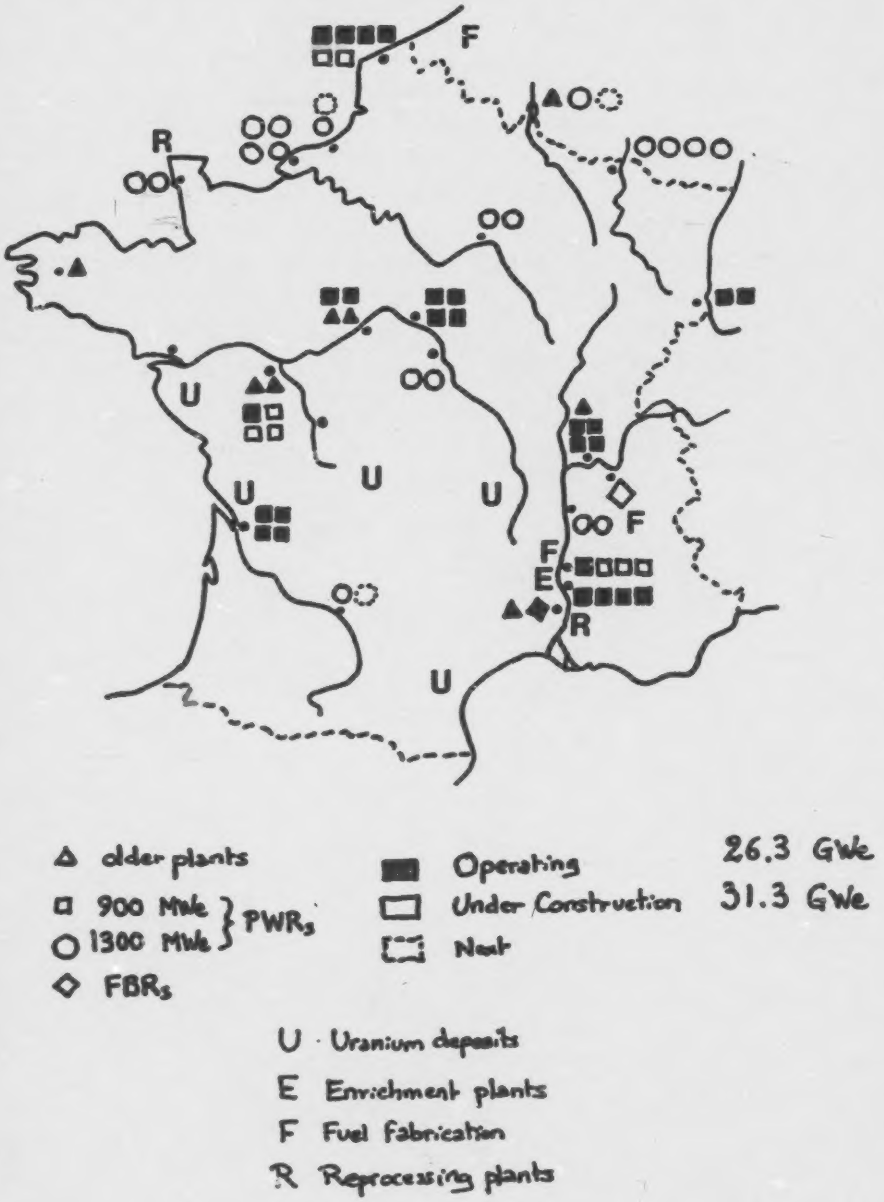
F
R
U
U
U
U
U
F
F
E
R
△ older plants
□ 900 MWe } PWRs
○ 1300 MWe
◇ FBRs
■ Operating 26.3 GWe
□ Under Construction 31.3 GWe
⬚ Next
U · Uranium deposits
E Enrichment plants
F Fuel fabrication
R Reprocessing plants

FIGURE 2

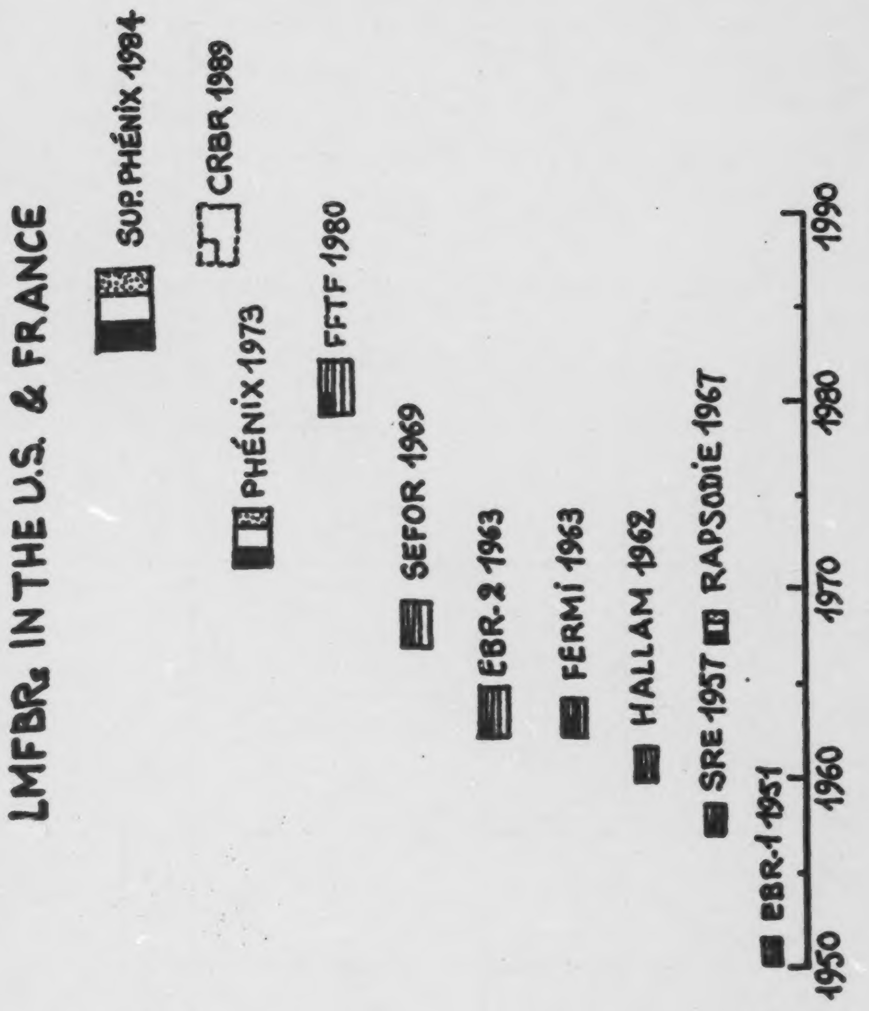
LMFBRs IN THE U.S. & FRANCE
SUP. PHÉNIX 1984
CRBR 1989
PHÉNIX 1973
FFTF 1980
SEFOR 1969
EBR-2 1963
FERMI 1963
HALLAM 1962
SRE 1957
RAPSODIE 1967
EBR-1 1951
1950
1960
1970
1980
1990

FIGURE 3

TOTAL PLANT RADIATION DOSE TO ALL PHENIX PERSONNELS

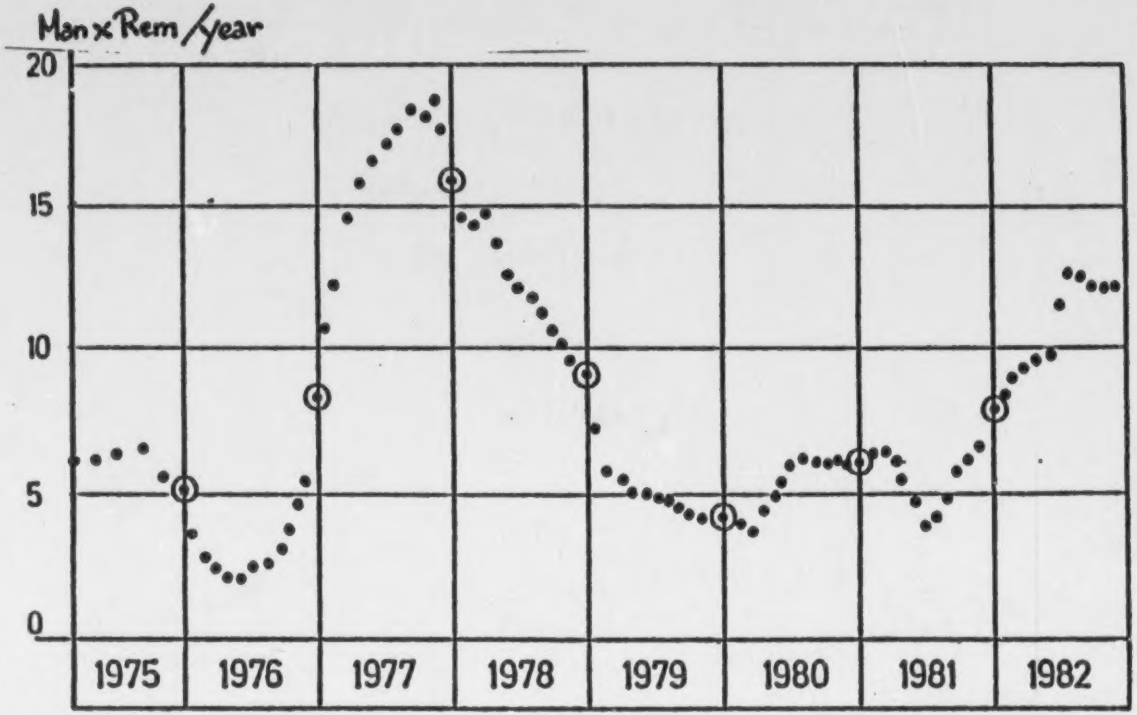

FIGURE 4

MAIN CHARACTERISTICS OF THE FRENCH LMFBR

	RAPSODIE	PHENIX	SUPERPHENIX	1500 PROJECT
THERMAL RATING MW	24, THEN 40	568	2990	3600
ELECTRICAL RATING MW	0	250	1200	1500
FUEL	$(UO_2 - PuO_2)$			
CLADDING	STAINLESS STEEL			
COOLANT	LIQUID NA			
DESIGN	2 LOOPS	POOL (3 PUMPS)	POOL (4 PUMPS)	POOL (4 PUMPS)
VESSEL DIAMETER (M)	*	12	21	20

(*) COMPARISON IRRELEVANT BECAUSE OF DESIGN DIFFERENCE

Mrs. LLOYD. Thank you very much, Mr. Barre, for your statement. We do appreciate you being here.

There are some opponents of Clinch River that—of the project that have made the following statement: "The French pay for their industrialization development breeder, Superphenix, entirely through increased utility rates and foreign participation; 51 percent of the plant's cost is paid through increased utility rates. The remainder comes from foreign utility contributions."

In other words, you are making the ratepayer carry an overwhelming burden for a prototype type plant project. Would you comment on that statement for the record?

Mr. BARRE. I will simply describe the reality. Superphenix is a multinational plant. It is owned and operated by NORSA, the company which shareholders are Electricite de France for 51 percent, the Italian NL for 33 percent, and the mostly German SBK for the remaining 16 percent.

Each shareholder pays for its own share of the total cost of the plant and each one will get back its shares of the power generated. I do not know how the other participants finance their share, but I can describe what is happening with the 51 percent French.

Electricite de France puts down the same amount of money it would have to pay for a pressurized water reactor of the corresponding generating capacity. And the French Government pays for the additional cost because of the development nature of the plant.

I think it is a fair deal, but also I would like to underline that EDF is our only utility and it is state owned, so that the distinction between ratepayer and taxpayer may be slightly academic in our case.

Mrs. LLOYD. Thank you very much for clarifying your statement.

Another question I want to ask you, I do know that there are ongoing negotiations now with the United Kingdom in your country with respect to breeder cooperation.

Do you really think the recent British decision indicating that they—indicates that they've given up having similar cooperation with the United States as we had planned on for so many years?

Mr. BARRE. Frankly, I think I cannot answer for the British, no.

Mrs. LLOYD. I recently met with an official of the United Kingdom, who said they intended to work with you. They would open up formal negotiations to seek development on a joint fast reactor as a result of the fact that we have been lagging, that we no longer have a place at the nuclear table because of the lag in our program. And that was what I had asked you to comment upon.

Mr. BARRE. I would rather refer the committee to the statement that the Honorable Peter Walker, the British Secretary, issued last week where I think he definitely keeps open the door for any new cooperation.

And the only additional comment I can make is of a general nature. When such official statements are issued, carefully worded as they may be, it usually is a sign that this is already well underway.

Mrs. LLOYD. So you feel that the United Kingdom is keeping open the possibility of extending the international collaboration between—outside of Europe when the time is right, then?

Mr. **Barre**. Well, I think that it is more general. I think that Europe, which is now kind of united, is certainly very open to extending the cooperation anywhere else.

Mrs. **Lloyd**. Well, thank you very much.

Mr. Ottinger.

Mr. **Ottinger**. Can you give us any idea of what the capital costs, the cost per kilowatt hour of operating hour on Phenix are anticipated to be on Superphenix?

Mr. **Barre**. It is very difficult to express it in a significant currency. Since I have been in this country, the dollar has jumped from 4 to 8 francs and we are discussing costs which were incurred between 1969 and 1973. So, I will tell you what it is in francs and maybe let you the responsibility to convert it.

The cost of Phenix, total construction cost without taxes and not including the fuel, was 620 million francs was spent between the years 1968 and 1973. My guess, if I had to convert it in today's franc, would be on the order of 1 billion, and I would not make the conversion from franc to dollar.

Mr. **Ottinger**. What is the cost per kilowatt hour, the power——

Mr. **Barre**. The cost for—per kilowatt hour of Phenix is not really significant because the capital cost was not included in the rate. I can only tell you that when the EDF started operation of Phenix, there was a convention that EDF would pay for the cost of Phenix the same price it was paying for a similar sized plant which was oil fired. And that in 1976 EDF asked for reconsideration of the convention.

Mr. **Ottinger**. How does the cost of Phenix compare to the cost of power from efficient plant?

Mr. **Barre**. Well, there again I am not sure I can answer truly. Certainly several times. But still it was interesting for EDF to decooperate from an oil-fired plant which was operating and which was supposed to be the reference plant in the start. So it is not, it has never meant to be at this stage competitive with PWR. Not even Superphenix is supposed to be.

But the cost bracket for Superphenix cost production will be between 30 and 40 centimes per kilowatt hour. And I strongly suspect that the honorable witness which spoke about 40 cents is just confounded between cents and centimes. That is about twice the cost of the electricity produced by a light-water reactor. That is far less than the oil-fired costs. As I have indicated, in the French situation, where we import out coal, it is about break even with coal.

Mr. **Ottinger**. Does that include the capital costs?

Mr. **Barre**. That does.

Mr. **Ottinger**. Why has France decided to cancel the plans to proceed with six Superphenix reactors?

Mr. **Barre**. I wouldn't exactly use those words because we never had commitments beyond Superphenix and we don't have today. We had forecasts dating back in the seventies of at some point building a series of six identical plants, and we have scaled down from those forecasts because, as I have just indicated, we have launched the detailed design of one 1,500 megawatt to be built maybe in 1985.

The reason is simple. It has been explained by some previous speaker. The main incentive of early deployment of the breeder was the threat of an imbalance between supply and demand on uranium at a time when the forecast of total generation worldwide was vastly bigger than it is now.

Now, due to the flood of cancellations occurring especially in this country, the picture of uranium energy supply demand is different, and we have just adapted to changing reality. We keep on putting a lot of emphasis improving and bringing to competitivity the breeder system. We do not plan to deploy it as early as we would have in 1974.

Mr. OTTINGER. You consider it economic at this point, then, or not economic, the Superphenix?

Mr. BARRE. Well, I have stated it without ambiguity that Superphenix will be not economic as compared with light-water reactor, very economic as compared with fuel oil, and just break even with coal. But Superphenix is just what have called in my report, the scale-up step. It isn't a competitiveness step. That is for the next.

Mrs. SCHNEIDER. Would the gentleman yield for a moment, please?

Mr. OTTINGER. Yes, surely.

Mrs. SCHNEIDER. I think it is important to point out that you are mentioning there is noncompetitiveness, and you made an earlier point in your statement that makes it very clear that this is the case in France, where you do not have the competition of the natural resources that we have here in the United States, such as some of the coal and such as some of the other natural resources.

So, I think that if there were an attempt by this committee or any members to draw a comparison between the cost competitiveness of various fuel sources in France versus those in the United States, in particular the breeder, I don't think that—I think that is trying to balance apples and oranges.

Mr. BARRE. May I also make a comment——

Mrs. LLOYD. The gentleman's time——

Mr. BARRE [continuing]. Because I agree with the comment it is trying to balance apples and oranges. The cost of electricity from PWR's in France is vastly inferior, as it is in this country, so the comparisons and balances are the other way around or so.

Mrs. LLOYD. Mr. Young?

Mr. YOUNG. Mr. Barre, on page 11, could you further comment on the fact that you seem to have solved the problem with the steam generator components? You started to allude to it on page 11 there. You seem to have solved that problem. Could you make a comment on that, please?

Mr. BARRE. Yes, sir. We had over the last 18 months three occurrences of leakage of steam in the steam generator, meaning that the steam went into the sodium circuit. And we have each time shut down the reactor quite in time. There hasn't been extensive damage, and of course there hasn't been any release of radioactivity because there is no radioactivity in the secondary loop.

We have now the explanation it was linked to a problem of operation at low power, where during the bypass of the turbine some hot water came at some point in the radiator section, where it is not meant to be hot—cold water. So, it is a matter of operational procedures.

The radiator section of all three steam generators have been replaced. The reactor has been back in full power since August 15. And that is one of the things I meant when I say the experience of Phenix will not be lost on Superphenix because now we know that we have to be careful in reassessing the approach to power procedure for Superphenix.

Mr. **Young**. Thank you very much, sir.

No other questions, Madam Chairman.

Mrs. **Lloyd**. Mr. Brown.

Mr. **Brown**. We have observed the operation of your breeder program for a number of years here and have always admired the careful development program and the success of that program. I think we have a great deal to learn from it.

Could you comment briefly on your overall safety program—safety record in the breeder program? You have referred to some shutdowns. Has there been any accidents that caused loss of life or other problems that go beyond your experience with the light-water reactors?

Mr. **Barre**. No, sir. I think I have even stated that by now we consider that the safety of the LMFBR is at least equal to that of light-water reactor, and if you will allow me other trivial comparison, is like comparing a pressure cooker and a frying pan. You have not exactly the same problem, but if you are careful, you can operate safely both the pressure cooker and the frying pan.

Mr. **Brown**. You mention that the Rapsodie is being decommissioned at the present time. Will that be your first experience in France with the decommissioning of a nuclear plant? You haven't decommissioned any light-water reactors?

Mr. **Barre**. We haven't decommissioned any light-water reactor, but we have already decommissioned up to certain degrees at three gas-fired plants of an earlier generation. When I said to a certain degree, it is because decommissioning can mean a lot of different things. It can be just putting back to the grassland area and building a nursery school on the place, or it can be just removing everything that is active and keeping the site for nuclear business.

As far as our ultimate philosophy is concerned, we do not know yet exactly what we will choose, but we have already some actual decommissioning experience and we have also decommissioned some facilities of the fuel cycle completely.

Mr. **Brown**. Well, since we haven't gone through that experience yet, there is still some question, at least in my mind, as to what the cost of decommissioning is going to add to the overall cost of the production of energy in nuclear plants.

You wouldn't have yet any figures that would indicate the cost of a decommissioning operation, I presume?

Mr. **Barre**. No, I have no actual figure to give you. I can just tell you that a basis for including decommissioning cost into our cost projection for the production of electricity, and that is true for our light-water reactor or Superphenix, it is included. It is 10 percent of the construction cost. But I would be hardly pressed to justify a plus or minus anything.

Mr. **Brown**. I understand that in France you have a uniform electric rate throughout the country. I may be mistaken on this, but I am asking if this is true, so that regardless of the source of the electricity the consumer pays the same price throughout the country. Is that correct?

Mr. BARRE. This last part is correct, but the rate is not uniform for big users, industrial users, or domestic users. And there has been rather recently proposals to decrease the rate as an incentive for people to accept construction of plant, which would be just localized kind of rate——

Mr. BROWN. Let me see if I understand that. You say the people in the vicinity of a nuclear plant receive a lower rate as an incentive to allow the construction of the plant? Is that what——

Mr. BARRE. That is a proposal, and that does not apply to nuclear plant. In the vicinity of a generating plant.

Mr. BROWN. It might be a useful proposal over here, too.

Mr. BARRE. Why not?

Mrs. LLOYD. Would the gentleman yield?

Mr. BROWN. Certainly.

Mrs. LLOYD. Is he proposing we build a Clinch River in California?

Mr. BROWN. If it means cheaper electricity, I might do that.

I appreciate your comments with regard to the importance of proceeding with the full-scale demonstration, but the argument over here that seems to have developed the greatest weight is that the economic situation with regard to the supply of uranium does not yet make it necessary to proceed to the development of full-scale commercialization.

Now, in some—to some extent your testimony would seem to indicate that France has come to the same conclusion with regard to the building of additional Superphenix, that it is not competitive because of the changing supply of uranium and it is more economical for you to continue with the light-water reactors.

Would that be a correct interpretation?

Mr. BARRE. That might be stretching a little my presentation. What I had told you is we had delayed our introduction of a commercial series. Superphenix was never meant to be a commercial plant. It was meant to be a full-scale plant and we will know by next year if it works. So in any time taking any decision between Superphenix would not have had any meaning before checking that it works.

Mrs. LLOYD. The gentleman's time has expired.

The gentlelady from Rhode Island. I apologize, I did not call on you first.

Mrs. SCHNEIDER. That's one.

Mr. Barre, I wonder if you could please tell me if the United States decides not to go ahead with the Clinch River project, the French will proceed with their breeder projects; is that correct?

Mr. BARRE. Well, I think we would—the future is never certain. I will even elaborate a little. If you had asked me the question 1 year ago——

Mrs. SCHNEIDER. Uh-huh.

Mr. BARRE [continuing]. I might have a little more reservation. But since then—because at that time we felt a little lonely. But since then, I may point out, that the German election have changed the picture and the prospect for the German breeder immensely. The Japanese have decided completely to go along building the Monju reactor and certainly if we have made efforts to attract the British in our sphere of interest, it is not to stop the program.

Mrs. Schneider. Well, are you in competition with the United States in terms of the development of the breeder? Do you consider yourself in competition?

Mr. Barre. We kind of borrowed the breeder technology from the United States. I have never claimed that we invented it. I could point out a lot of features of our program which was just plain borrowing from the earlier development in this country. And for the time being, we are not in competition because there is no marketplace where to compete. We are not developing a commercial product and offering it to sell today. So the term "competition" is probably not an accurate description.

But if you meant it are our teams competing for the best, then, of course, yes, that's a very friendly competition but very liberal.

Mrs. Schneider. Well, let me say that if you are encouraged—if you are not in com—if you are in competition with the United States for the development of the breeder, then it seems strange that you would be encouraging us to pursue Clinch River.

If you think that you are not in competition with us, then I am wondering if your encouragement to us to continue to develop this is because you still are feeling a little insecure that you might continue to be alone in the development of the breeder despite the recent involvement of other countries. And I am—I get the feeling that misery enjoys company, quite frankly.

But let me move on to another question. Does the French——

Mr. Barre. May I settle this one?

Mrs. Schneider. Well, I thought—sure, you can comment on that only I'm running out of time, and I thought you had.

Mr. Barre. I think, uh—we have cosponsored at the head of state meeting of both Versailles and Williamsburg, an expert meeting on just what good was cooperating on the breeder. And it would have been to me evading our responsibility as coleader of this group by just not accepting the invitation of the chairman.

Mrs. Schneider. OK, let me proceed. The French Government owns its own electric supply; is that correct?

Mr. Barre. That is correct.

Mrs. Schneider. And all the fuel sources are also owned by the French Government such as the coal, the hydro, uranium?

Mr. Barre. Well, that—I have to be a little more precise. The utility is owned by the Government. Some—a very small part of the production is bought by the utility which has its own monopoly of distribution.

Mrs. Schneider. Well, let's focus on the uranium then.

Mr. Barre. The uranium that we use in our program comes either from France or from the world markets. We are presently supplying a little less than half of uranium from France and buying the rest around.

Mrs. Schneider. OK.

Mr. Barre. Our projections show that we will stabilize our domestic uranium to about one-third of our needs unless there is a problem cutoff elsewhere and we will increase it.

Mrs. **Schneider**. In other words, though, the French electric power system is essentially entirely nationalized?

Mr. **Barre**. That's correct.

Mrs. **Schneider**. And you are aware that here in the United States this system is entirely different, that 80 percent of our electric power supply system is privately owned?

Mr. **Barre**. I am aware.

Mrs. **Schneider**. OK. Have you—why have the French not signed the Nonproliferation Treaty?

Mr. **Barre**. I fail to see the relation.

Mrs. **Schneider**. Well, I am just curious.

Mr. **Barre**. At that time when the Nonproliferation Treaty was being developed and I would say offered, we felt that it had some discriminatory aspects we didn't want to endorse. So what we did was say pledge that we would abide by the kind of rule of the game that the treaty established but that we would not sign. I do not know if we will change this position but for the time being that's just a fact.

Mrs. **Lloyd**. We thank you, Mr. Barre, for your very valuable testimony and for taking your time to be with us today. We feel that there may be more questions asked by this committee that we will submit in writing and we hope that you will respond to.

Mr. **Barre**. Thank you.

Mrs. **Lloyd**. At this time I would like to ask unanimous consent that several statements be included as a part of the record, and these are all very short, they are not voluminous.

The statement of the Ambassador of the Federal Republic of Germany, Mr. Kennedy's statement on behalf of the State Department; the Congressional Budget Office statement which we have not received, as well as our statement on the work of the United Kingdom.

Without objection, these will be included in our record.

[The statement follows:]

THE AMBASSADOR
OF THE FEDERAL REPUBLIC OF GERMANY

September 13, 1983

The Honorable
Marilyn Lloyd
Chairman, Subcommittee on
Energy Research and Production
U.S. House of Representatives
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mrs. Chairman:

I should like to thank you for the invitation to explain the breeder reactor development program of my country before the Subcommittee on Energy Research and Production.

The Government of the Federal Republic of Germany is observing the efforts of the U.S. Congress and the U.S. Federal Administration concerning breeder reactor development with great interest and welcomes the opportunity to share German experiences and views on this subject.

I therefore transmit the attached written statement answering the questions outlined in your letter.

Sincerely yours,

Peter Hermes

Peter Hermes

Encl.

PROGRAMME FOR THE DEVELOPMENT OF FAST-BREEDER REACTORS IN THE FEDERAL REPUBLIC OF GERMANY

I.

The Breeder Programme of the Federal Republic of Germany is divided into two main spheres:

- Installation and entry into service of the SNR 300 Prototype Nuclear Power Station near Kalkar, Lower Rhine, equipped with a sodium-cooled fast reactor (rated power 280 MW electrical). The SNR 300 fast breeder was ordered in 1972 and at the present rate of progress will start operations in 1985.
- The Fast Breeder Research and Development Programme, within the scope of which both research and development work associated with the building of the SNR 300 and work on further developing the breeder reactor series are being carried out.

The development of breeder reactor power stations is embedded in the Federal Government's overall energy policy, as was stated in the 1973 Energy Programme of the Federal Government and subsequent updates. The Federal Government regards the series of breeder reactors as an important means of ensuring the long-term peaceful use of nuclear energy and contributing to an ecologically beneficial energy supply. Breeder reactors, particularly the construction and operation of the SNR 300, are subject to very strict authorization procedures. Under the system security and protection of the public and employees are given priority.

Since the beginning of the seventies a vigorous debate has been going on in the Federal Republic of Germany over the pros and cons of the SNR 300 construction. This debate focused less on technical than on socio-political questions. In 1978 the German Bundestag made a reservation against the start-up of the SNR 300, which it withdrew after thorough discussion in a commission of enquiry into matters concerning future nuclear energy policy. On this occasion the Bundestag expressly stated that there were no political objections to the SNR 300 beginning operations.

The financing of the SNR 300 which has long been a problem is now assured. In 1983, on the basis of a financial contribution from energy suppliers and industrial enterprises, the Federal Government consented to the completion of the SNR 300 and set aside in the budget the substantial funds needed. As a basis for the decision of the Federal Government on the continued financing of the SNR 300, the Federal Minister for Research and Technology submitted a report on the state and prospects of advanced high-temperature and breeder reactor series. An important feature of this report, which also contains an outline of the SNR 300 Programme, is its comprehensive discussion of the pros and cons of breeder development in general. The report is enclosed as an Annex, but is only available in German.

II.

Since its earliest stage of development, breeder reactor technology has been developed in close cooperation with other countries, particularly with members of the European Community. The Governments of Belgium and The Netherlands as well as electricity suppliers and manufacturing firms from those countries are participating in the financing and production of the SNR 300. Particularly close cooperation with France is taking place in the further development of the breeder reactor series. There is German participation in Super-Phenix and there is a financing agreement among energy suppliers from France, Italy and the Federal Republic of Germany for the planned German SNR 2. Research and development programmes in the five countries referred to above are constantly coordinated.

- 4 -

In full agreement with the Williamsburg Declaration on Economic Recovery, these countries are currently extending their cooperation.

On September 5, 1983, the Government of the United Kingdom decided "to open formal negotiations to seek agreement on joint development of fast reactors with France, Germany, Italy, Belgium and The Netherlands".

III.

On the question of the importance attached by the Federal Government to the Clinch River Breeder Reactor (CRBR) Programme with regard to non-proliferation or other international goals, our comments are as follows:

Again and again there have emerged from the United States breeder programmes and their findings valuable new ideas and approaches which also benefit development work in other countries. The experience gained in construction and operation of the CRBR will also be of value to other countries which are pursuing breeder development programmes.

Larger-scale breeder development programmes are presently being implemented only in highly advanced industrial states. In view of the worldwide reduction in plans for the development of nuclear energy and the fact that a great deal of time-consuming work must be accomplished before breeder reactor technology can be used economically, countries which have not so far taken part in breeder development cannot be expected to be induced by the CRBR Programme to initiate their own breeder development.

Neither does the CRBR Programme create a new situation as regards the non-proliferation issue, especially since smaller breeder reactors were already, or are now, in operation in the United States. Furthermore, INFCE recognized the need for the use of breeders in idustrial states and stated that no reactor type or fuel cycle presented any special proliferation problem where safeguards were applied. This is all the more true since the western countries with the larger breeder programmes (Belgium, France, the Federal Republic of Germany, Italy, Japan, The Netherlands and the United Kingdom) are allied and linked by treaties and agreements with the United States. The statement of July 16, 1981, by the President of the United States also refers to these countries.

In 1954 the Federal Republic of Germany renounced her right to produce nuclear weapons. Since 1957 she has been a member of the European Atomic Energy Community (EURATOM) and since 1975 a party to the Non-Proliferation Treaty. Accordingly, in all peaceful nuclear activities in the Federal Republic of Germany all source and special fissionable material is subject to twofold international safeguards. In this context, attention is drawn to Item 6 of the Declaration made by the Federal Government of Germany on depositing the instrument of ratification of the Non-Proliferation Treaty. In its Declaration, the Government of the Federal Republic of Germany emphasized the crucial importance attached by it to the application of safeguards in nuclear plants devoted to peaceful purposes in nuclear-weapon states. Since the IAEA first applied safeguards in the U.S., it has also been possible to subject the CRBR Programme to safeguards within the scope of the voluntary offer.

DEPARTMENT OF STATE
AMBASSADOR AT LARGE
WASHINGTON

September 21, 1983

Dear Madame Chairman:

I am pleased to respond to your request for my views on the Clinch River Breeder Reactor (CRBR) Project as it may relate to achieving U.S. non-proliferation and other international goals.

A number of large industrialized countries have, as a major element of their ongoing energy research and development efforts, programs designed to assess the promise of the fast breeder reactor as a potentially significant future energy source. Most recently, for example, the United Kingdom has indicated that it plans to open negotiations leading to participation in development with a European group, including France, the FRG, Italy, Belgium and the Netherlands.

The Liquid Metal Fast Breeder Reactor (LMFBR), the concept of the Clinch River Breeder, has been widely considered as the most promising concept for research and development. Development programs and plans all comprise base technology efforts accompanied by construction and operation of progressively larger breeder power plants. Demonstration LMFBR's of the same intermediate size class as Clinch River have been operated in the United Kingdom, France, and the USSR; construction of such plants is also planned in Japan and the FRG.

The LMFBR involves the use of substantial quantities of plutonium and also involves the use of reprocessing technology to separate and make available that plutonium. Thus, international safeguards and physical security arrangements are vital considerations in the development of any system. This in turn will require both leadership and international cooperation, if the non-proliferation goals we seek are to be achieved and protected. Active U.S. participation in such a program would enhance our ability to contribute effectively and to have the impact which our technical competence and commitment to sound non-proliferation standards justify. If, on the other hand,

The Honorable
Marilyn Lloyd, Chairman,
Subcommittee on Energy Research
and Production,
Committee on Science and Technology,
House of Representatives.

the United States does not play an active role in breeder technology development and demonstration, its ability to influence the formulation of safeguards and physical security systems and techniques essential to the future deployment of that technology will be diminished.

The Administration seeks to enhance the posture of the United States as a reliable supplier and cooperative partner in the use of nuclear energy for peaceful purposes. At the same time, it seeks to assure that sensitive technologies, such as reprocessing and the breeder reactor, are not employed except where advanced nuclear programs are in place and there is no proliferation risk, as is the case of the industrialized countries now pursuing breeder research and development. The simple fact is that this development is going forward, and the United States will better be able to affect the course of the development in ways that can most effectively support its non-proliferation goals and objectives, if it participates actively in it.

Active United States' participation on its own account and cooperation with others will facilitate the development of the essential agreed set of norms and procedures which will lessen the potential proliferation risk associated with the use of plutonium in the fast breeder reactor program. An active U.S. system development program could provide a basic test bed for the development and application of such norms and procedures. In this way, the United States would be able to exert the fullest measure of influence and give the most effective guidance.

For these reasons, I believe that if it were decided to go forward with a fast breeder reactor development program, such as that contemplated with the Clinch River LMFBR, important non-proliferation objectives could be well served and United States leadership in the effort to strengthen the worldwide non-proliferation regime could be furthered.

The Office of Management and Budget advises that from the standpoint of the Administration's program, there is no objection to the submission of this letter.

Sincerely,

Richard T. Kennedy

CONGRESSIONAL BUDGET OFFICE
U.S. CONGRESS
WASHINGTON, D.C. 20515

Rudolph G. Penner
Director

September 20, 1983

Honorable Marilyn Lloyd
Chairman
Subcommittee on Energy
and Production
Committee on Science
and Technology
U.S. House of Representatives
B-374 Rayburn House Office Building
Washington, D.C. 20515

Dear Mrs. Lloyd:

In response to your request, I am pleased to provide you with a copy of our Staff Working Paper, the Comparative Analysis of Alternative Financing Plans for the Clinch River Breeder Reactor Project. I hope you find this study useful.

Should your Subcommittee so desire, we would be pleased to answer any questions you may have concerning this analysis.

Sincerely,

Rudy Penner

Rudolph G. Penner
Director

COMPARATIVE ANALYSIS OF ALTERNATIVE FINANCING PLANS FOR THE CLINCH RIVER BREEDER REACTOR PROJECT

Staff Working Paper

September 20, 1983

Congressional Budget Office
Congress of the United States

This study was prepared by the staffs of the Natural and Physical Resources Cost Estimates Unit of the Budget Analysis Division and the Tax Analysis Division of the Congressional Budget Office at the request of the Subcommittee on Energy Conservation and Power of the House Committee on Energy and Commerce. Questions regarding this analysis may be addressed to Jeffrey Nitta (226-2860) or Robert Lucke (226-2720).

As mandated by the Congress, the Department of Energy has transmitted a new plan for financing the Clinch River Breeder Reactor Project (CRBRP) involving greater participation from the private sector. At the request of the Subcommittee on Energy Conservation and Power of the House Committee on Energy and Commerce, the Congressional Budget Office (CBO) has prepared an analysis of the proposed financing plan, assessing its long-term impact on the federal budget compared to the alternative of full federal funding of the remaining costs. This paper describes the background of the new financing plan and the CBO analysis of its budget impact.

BACKGROUND

The CRBRP was authorized in 1970 and initial appropriations were provided in 1972. The cost of the project was estimated in 1972 to be $699 million, based on manufacturers' conceptual designs. In 1973, utilities committed themselves to pay $257 million plus interest to the CRBRP. The Department of Energy now estimates that interest will raise the utility commitment to more than $340 million. After detailed cost estimates and reference designs were completed in 1974, the estimated costs of the project rose to over $1.7 billion, assuming operation in 1982. Funding restrictions, delays, licensing requirements, and cost reestimates have since raised the estimated costs to over $4 billion, of which nearly $1.7 billion has been spent. In the Further Continuing Appropriations Act for Fiscal Year 1983, the Congress directed the Department of Energy to report on options to secure additional private sector participation in the CRBRP that would reduce the federal budget requirements. An initial report was submitted in March, and a second more detailed plan was submitted in early August. No funds were included in the Energy and Water Appropriations Act of 1984 for the CRBRP pending action on private financing. Work continues, however, on site preparation activity.

Responsibility for the CRBRP is governed by contractual agreements involving the Department of Energy, the Commonwealth Edison Company, the Tennessee Valley Authority (TVA), and the Project Management Corporation (PMC). The latter represents the interests of contributing utilities in the management of the project. The Breeder Reactor Corporation (BRC) was established to represent the electric power industry in providing assistance and support to the project.

Under present working agreements, if the project is to be completed by 1990 as currently planned, the government will be responsible for providing an estimated additional $2.3 billion to complete construction. As part of their original commitment, utilities (through the BRC) are obligated to provide an additional $175 million. 1/ The TVA is required to purchase power generated by the CRBRP for the first five years of the project's operation, and has the option to purchase the plant at the end of that period. No specific agreements have been reached regarding the operation of the project after the five-year period.

THE BRC PLAN

In response to the Congressional directive, the Department of Energy explored options to secure additional private sector financing for the CRBRP. The Breeder Reactor Corporation prepared a proposal that would increase private participation in the funding of the CRBRP. It includes $1.5 billion in additional government financing and $825 million in additional private funds, the latter consisting of $675 million in short-term lending and $150 million in equity participation (see Table 1 below). This plan was endorsed by the Administration and transmitted to the Congress by the Department of Energy on August 1, 1983.

TABLE 1. PROPOSED SOURCES OF CRBRP FUNDS, 1984-1990 (In millions of dollars)

	Current Arrangements	Proposed BRC Plan	Difference
Government Appropriations	2,325	1,500	-825
Utility Contributions	175	175	---
Equity Participation	---	150	150
Private Lending	---	675	675
Total	2,500	2,500	---

1/ This is in addition to the utility contributions to date, which, with accrued interest, total $166 million.

Under the proposed plan, the federal government would be required to cover the full costs of the equity investment, as well as principal and interest payments on the debt, through various tax benefits, project revenues, and, if necessary, federal payments. Thus, the proposal embodies virtually no risks to the new private sector participants. The short-term private investment of $675 million would be retired in 1990 by the issuance (by the equity investors) of an estimated $1.04 billion in 30-year bonds, which would cover the $675 million in short-term construction loans plus interest accrued at 10 percent. The plan would require a government commitment to cover the principal and interest payments on the bonds, either from the reactor's power sales or, if those are not adequate, from other government funds. The sale of $150 million in equity shares in the project would be attracted through a guarantee of tax benefits and a share of revenue not needed to pay interest on the debt. Because of the uncertainties associated with the newness of the technology, licensing requirements, and the volume and price of future electricity sales, the BRC proposes that the government guarantee that both the equity and the debt holders will be repaid their investments, as well as a minimum rate of return. The actual rates of return would be open to negotiation and would reflect market conditions at the time. All cost overruns would be paid for in full by the federal government.

THE ALTERNATIVE: GOVERNMENT FINANCING

For the purpose of this analysis, the BRC plan is compared to an alternative that assumes:

- Federal funding of an additional $2.3 billion in construction costs;
- Utility contributions, already committed, of $175 million;
- Continued government operation of the reactor through the year 2020, with sales of power at market rates throughout the period;
- Completion of the project at the same cost and at the same time as under the BRC plan.

As with the proposed BRC plan, this alternative (which we will generally refer to as the "government-financed" plan) would require a change in the current contractual agreements, because of the present requirement that the TVA must buy the power produced by the CRBRP for the first five years at avoided energy costs. 2/ This restriction could, at the discretion of the Congress, be maintained or removed regardless of which financing plan is selected. Therefore, in analyzing the two basic alternatives, power sales at market rates were assumed for both.

The analysis also assumes that TVA would not exercise its option to purchase the reactor after five years of operation. In view of TVA's recent reductions in its own plans for construction of power-generation facilities, all indications are that TVA would probably not acquire the plant.

ESTIMATED BUDGET IMPACT OF THE BRC PLAN

CBO has analyzed the budgetary impact of the proposed BRC plan on both outlays and tax revenues, assuming that the project is completed within current cost estimates and on schedule, and that the financing terms would be those assumed by the developers of the plan.

Compared to the government-financed plan described above, the BRC plan would:

- Reduce federal outlays for project construction;
- Reduce federal tax revenues in the early years (through 1995), and increase them in subsequent years; and
- Reduce or eliminate federal receipts from the sale of power.

Each of these effects is discussed separately below.

Construction Outlays

Under the BRC plan, the government would spend $1.5 billion and private parties $1.0 billion to complete the CRBRP. This would reduce federal outlays by $825 million between 1984 and 1990--with $150 million provided by equity investors and $675 million covered by short-term construction loans.

2/ Avoided energy cost is the incremental cost to an electrical utility of electric energy or capacity or both.

Tax Revenues

The equity participants, in return for their investment, would be entitled to potentially large tax credits and deductions. The proposal does not assume any new tax benefits; it only requests that the federal government guarantee to make appropriate repayments to the equity investors if the current tax incentives are not made available as planned. On this basis, the equity investors would be entitled to the 10 percent investment tax credit on the $825 million of private investment, depreciation on 95 percent of the investment using the accelerated cost recovery system (ACRS), and deductions of construction interest costs. 3/ Offsetting these tax losses would be the revenue generated by taxes on the bond interest and on power revenues received by the equity investors.

The Investment Tax Credit. The equity holders would be entitled to take the 10 percent investment tax credit (ITC) on the full amount of the private investment ($825 million), as progress payments were made on the CRBRP. Over the 1984-1990 period, the cost of these credits to the U.S. Treasury would be $82.5 million.

Accelerated Depreciation. The equity participants would be allowed to take depreciation under the accelerated cost recovery system. Because the proposal requests that the project be exempted from the rules regarding public utilities, it is assumed that that property would be depreciated over five years. (If the property was classified as public utility property, it would be depreciated over ten years.) The investors would be allowed depreciation deductions based on only 95 percent of the cost of the project. They could not depreciate 100 percent of their investment because of the 50 percent basis adjustment for the ITC required by the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA).

3/ In general, the deductions and credits from the CRBRP would exceed the anticipated income from the project during the construction phase and its first few years of operation. Because of this, the BRC plan has been designed as a partnership so that the investment tax credit (ITC) and the deductions for depreciation and construction interest could be used to reduce the investors' outside taxable incomes. The partnership arrangement outlined by the BRC would allow the full tax deductions to be passed through to the equity investors. Because of the "at-risk" rules in the tax code, it is expected that virtually all of the equity participants would be corporations. The at-risk rules limit an individual's tax loss in any given investment to the amount the investor stands to lose in the venture. These rules do not apply to corporate investors.

For the purposes of this analysis, it is assumed that the equity investors would be corporations subject to a marginal tax rate of 46 percent. The private investors would not be allowed to start taking depreciation until 1991, when the plant was placed into service. The revenue loss to the government from these deductions would be an estimated $361 million, occurring over the 1991-1995 period. (If the property was classified as public utility property, the revenue loss would be the same but would be spread out from 1991 through 2000.)

Construction Interest. It is assumed that the investors would be allowed to deduct interest expended during the construction period (1984-1990), estimated to total $365 million. Although the interest would be deductible by the equity holders, it would constitute taxable income to the lenders. The net cost of this provision to the government would be the differential in tax rates between the equity investors and the lenders. In this analysis, it is assumed that the equity investors would be in the 46 percent tax bracket and the lenders in the 25 percent tax bracket. 4/ This difference in tax rates would result in a net cost to the government of $77 million over the 1984-1990 period. If the borrowers and lenders were assumed to be in the same tax bracket, this provision would not result in a net cost to the Treasury.

Although it is assumed that the equity holders would be allowed to expense interest during the construction phase of the project, they might be required by the Internal Revenue Service (IRS) to "capitalize" the interest payments. 5/ TEFRA requires firms to capitalize interest payments related to nonresidential real property. Although ten-year public utility or five-

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4/ The tax rate on the equity holders is higher than the assumed rate on the bondholders because the equity participants will primarily be corporations (which have a marginal rate of 46 percent). The bond interest recipients are assumed to be individual taxpayers. The average marginal tax rate for individuals receiving interest income is approximately 25 percent (see U.S. Department of the Treasury, Internal Revenue Service, Statistics of Income--1979, Individual Income Tax Returns, 1982).

5/ Capitalized interest payments would not be deductible when expended but would be added to the basis of the property and recovered through depreciation. That is, the value of the property would increase by the amount of construction interest and would therefore increase the annual depreciation deduction proportionately. In addition, the capitalized interest payments would be eligible for the 10 percent ITC during the year in which they were incurred.

year recovery property is not considered in the class of nonresidential real property for depreciation, part of the CRBRP could be considered real property for purposes of the interest capitalization provision. The effect of capitalizing the interest payments is discussed later in this analysis.

Bond Interest and Power Sales. Offsetting the cost of the tax benefits allowed the private parties are the additional tax revenues associated with the project. The proposal estimates that the CRBRP would generate sufficient power sales to pay both the interest (at 10 percent) and the principal on the $1.04 billion of long-term debt. On an annual basis, the revenue required to pay off the bonds would be $110 million. For purposes of this analysis, it is assumed that the investors receive $110 million per year composed of net income, after operating expenses, from power sales or government appropriations. 6/ (If net sales income is less that $110 million, the government is assumed to cover the shortfall.) In the event that net income exceeds $110 million, it is assumed that the difference is turned over to the Treasury. (Although the plan is unclear as to how the revenues over $110 million would be shared, the assumption used here is conservative in that any residual revenue allocated to the private parties increases the net cost to the government of the BRC option.) Under these assumptions, the $110 million in annual net income is therefore not affected by the actual prices and costs of power over the life of the CRBRP.

It is assumed that the full $110 million per year received by the equity investors is used to pay off the long-term bonds. Because only the interest portion of the bond repayments constitutes a deduction for tax purposes, the equity investors would owe tax on the difference between the $110 million in revenue and the bond interest expense. Because the interest payments are also taxable income to the recipients, the full $110 million would be subject to taxation--partly to the equity investors and partly to the bondholders. The total additional tax revenue is estimated to be $29 million in 1991, increasing gradually to $49 million in 2020. 7/

6/ This is the assumption in the BRC proposal of 350 megawatts of capacity, utilized at 65 percent, and sold for 11 cents per kilowatt hour. Operating expenses are assumed to be 5.5 cents per kilowatt hour, yielding net sales income of 5.5 cents per kilowatt hour.

7/ The tax revenue grows from $29 million to $49 million because the bondholders are in a lower tax bracket (25 percent) than are the equity holders (46 percent). Because the bonds are assumed to be fully amortized over 30 years (structured like a mortgage), the percentage of the $110 million paid in interest declines over the life of the loan. Therefore, the share of the $110 million subject to the lower 25 percent tax rates falls, and the share subject to the 46 percent rate rises, over the 1991-2020 period.

Federal Receipts from the Sale of Power

While under the BRC plan revenues from power sales would accrue to the equity holders, such revenues would be paid to the Treasury under the government-financed plan. These receipts, net of operating costs, would be $110 million per year over the project's 30-year life, under the assumptions of this analysis. 8/

The cash flows to the federal government for the two basic alternatives are summarized in Table 2.

In the short run (1984-1990), the private financing plan would save the federal government $825 million in construction outlays. These savings would be partially offset by tax losses of $159 million ($82 million in ITC and $77 million net interest during construction). As a result, the net saving to the government in the short run would be an estimated $666 million.

Between 1990 and 2021, however, the government would relinquish $3.3 billion in potential power sales. In addition, the private parties would be entitled to ACRS deductions worth $361 million. Offsetting these costs would be tax revenues (from the bond and equity holders) in the amount of $1.05 billion. Thus, the private plan would add $2.6 billion more to the federal deficit than the government-financed case over the 1990-2021 period. 9/

8/ More generally, power sales are assumed to be equal in both the BRC and the government-financed cases. Under the BRC plan, if net income from sales is less than $110 million, the government must appropriate the difference to pay off the bondholders; in the government-financed case, it forgoes the same amount of power revenue. In other words, the incremental cost to the government of net sales income less than $110 million is identical in both cases. Because the government is assumed to retain 100 percent of the revenues in excess of $110 million, the marginal revenue from an increase in sales is the same for both cases. Because of this symmetry, the difference in net costs of the two plans does not vary if net power income differs from the assumed $110 million.

9/ These estimates do not include changes in interest on the public debt that would result from the two alternatives. Such interest costs are reflected in the present value analysis discussed in the following section.

TABLE 2. COMPARISON OF THE BRC PLAN AND THE GOVERNMENT-FINANCED PLAN (In billions of dollars)

	BRC Plan		Government-Financed Plan	
	1984-1990	1991-2020	1984-1990	1991-2020
Construction Outlays	1.5	---	2.3	---
Tax Losses				
ITC	0.1	---	---	---
ACRS	---	0.4	---	---
Interest deductions (net)	0.1	---	---	---
Less: Tax Revenue	---	-1.1	---	---
Less: Power Sales Income	---	---	---	-3.3
Total Increase or Decrease (-) in the Deficit	1.7	-0.7	2.3	-3.3

NOTE: The amounts in this table represent current cash flows, not discounted present values.

PRESENT VALUE ANALYSIS

Because the value to the government of receiving a dollar ten years from now is different (and less) than the value of receiving the same dollar today, it is useful to discount future outlays and revenues so that the alternatives can be more accurately compared. Discounting all future dollar amounts puts all cash flows on a commensurate basis, regardless of the year in which they occur. The total of all discounted future cash flows is the discounted present value of a project, and it reflects the current value of all dollar amounts. The discount factor used in this analysis is 6.75 percent, which represents the estimated after-tax cost of federal borrowing consistent with the bond rate assumed by the BRC plan. 10/

10/ The pretax interest rate is assumed to be 9 percent. Bondholders are in a marginal tax bracket of 25 percent, which results in an assumed after-tax interest rate of 6.75 percent.

Under the assumptions used in this analysis, the BRC plan would cost the government almost $250 million more than if the Congress chose to fully fund the project. (More precisely, the discounted value of the private plan is $248 million less than that of the government-financed version.) This indicates that the short-term savings from the BRC plan would not offset the higher costs to the government over the life of the plant.

The higher cost of the private plan reflects the fact that, under the BRC plan, the government is essentially borrowing funds from the private sector and paying a guaranteed rate of return higher than normal government borrowing costs. 11/ Under the private plan, the after-tax rate of return earned by the equity investors is about 37 percent; the rate of return for the bondholders is 7.5 percent. The difference between these rates and the government's after-tax discount rate (6.75 percent) accounts for the higher long-term cost to the government of the BRC plan.

SENSITIVITY ANALYSIS

The results of the above analysis do not change greatly even when the major assumptions are modified. Under varying assumptions, the private plan generally costs the government more than government financing, although the differences may be less than the $248 million (in present value terms) of the basic case described above.

Six alternative cases were analyzed to study the effect that modified assumptions would have on the present value of the BRC plan, as compared to the government-financed plan. They are as follows:

(1) Ten-Year Public Utility Property

Instead of depreciating the CRBRP over five years, it is assumed that the property is defined as ten-year public utility property. If all other assumptions are held constant, this change reduces the present value of the depreciation deductions and thereby reduces the cost to the government of the BRC plan by an estimated $24 million. The cost of the private plan, on a present value basis, would still exceed that of the government-financed version by $224 million.

11/ This is essentially the same conclusion reached by the General Accounting Office in its "Analysis of Studies on Alternative Financing for the Clinch River Breeder Reactor" (GAO/RCED-83-151), May 12, 1983.

(2) Construction Interest Capitalized

In the base case, it was assumed that construction interest was expensed. Alternatively, it can be assumed that the construction interest must be capitalized and recovered through depreciation. 12/ (It is likely that the actual tax treatment of the construction interest would fall somewhere between full capitalization and expensing.) Since the capitalization of interest payments would delay the realization of some of the tax benefits to the investors, this assumption would reduce the cost to the government of the BRC plan by an estimated $12 million on a present value basis. The cost of the private plan would still exceed that of the government-financed alternative by about $236 million.

(3) Equal Public and Private Borrowing Rates

The basic analysis assumed that the government's discount rate was 6.75 percent--based on a 9 percent borrowing rate and a 25 percent marginal tax rate. It can be argued, however, that the 1 percent interest difference (between 10 percent and 9 percent) should not be counted as an advantage of the government-financed case because it does not reflect the "true" cost of capital. Because the government is removing funds from the private sector that have an assumed marginal cost of 10 percent, the government's discount rate should reflect the alternative private cost of capital. If the discount rate is raised from 6.75 percent to 7.5 percent, the relative cost of the private plan is reduced, but remains $168 million above the government-financed alternative. 13/ (This difference reflects the return above 7.5 percent provided to the equity investors.)

(4) Combined Assumptions

If the assumptions in the three foregoing cases are combined--that is, the property is depreciated over ten years, all interest is capitalized, and

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12/ Capitalized interest payments are also allowed the investment tax credit when they are incurred.

13/ If the general level of interest rates varies from those assumed in the BRC plan, both the returns required by the investors and the appropriate discount rate would change. Such variations would not significantly affect the results of the analysis.

the discount rate is 7.5 percent instead of 6.75 percent--the cost to the government of proceeding with the private financing plan would be reduced, but would still be about $117 million above the cost of government financing.

(5) Power Sales to TVA

Under current contractual agreements, CRBRP power must be sold to the TVA for the first five years. If this requirement is maintained, power revenues would be substantially lower than if power was sold to private utilities. This case compares the government-financed option, assuming power sales to TVA, with the BRC plan, assuming sales to other utilities. It is assumed that the power is sold to TVA at cost--that is, the net cash inflow over the first five years is zero. After five years, net income from power sales is assumed to revert to the $110 million per year level. For this analysis the reduction in power sales is applied only to the government-financed case; in the private plan, net income is assumed to remain $110 million for all years. By sharply reducing federal receipts under the government-financed plan, this assumption would significantly increase the attractiveness of the private plan, to the extent that its long-term cost to the government would be $59 million less than the cost of the government-financed plan. However, just as the Congress, under the BRC plan, could terminate the obligation to sell CRBRP power to TVA, it could presumably take the same action under government financing.

(6) Reduced Power Sales

This case combines the five-year TVA assumption from case (5) above with an assumption of reduced power sales under the private plan in the first five years. In this case, it is assumed that private power sales are only 75 percent of $110 million (or $82.5 million) in the first five years. This could occur if the plant operated at a low capacity or prices were lower than anticipated. In this case, the government would have to appropriate $27.5 million per year in order to cover the repayments of the private bonds. Compared to case (5), the assumption of reduced private power sales increases the cost of the BRC plan because of this appropriation. If all other base case assumptions are held constant, the difference in discounted present value between the two financing alternatives is only $17 million.

The results from these sensitivity cases are summarized in Table 3. Both the government's discounted present value and the equity holders' rate of return are presented for each case. The differential cost to the government of the two financing alternatives is also shown. In all but one case, the cost of the BRC plan exceeds that of the government-financed option. Only case (5) has the opposite result, and that requires an assumption that power would be sold to TVA for the first five years, at below-market rates, only under the government-financed plan. Thus, if the Congress chooses to sell electrical power at below the private market price, the public plan may be the more costly alternative. On the other hand, if the Congress decides to sell the CRBRP power at private market prices, the public plan will be the less costly alternative. In sum, as long as the CRBRP power is sold at the same price under either the private or the public plan, the private plan will be the more costly alternative. The relative discounted cost of the private plan as against the public plan ranges from $117 million to $248 million under the alternative cases shown here.

It should be noted that the assumption that all residual revenues from the project accrue to the federal government minimizes the cost of the private plan. If a share of the annual net income (over the $110 million needed to pay off the bonds) was dedicated to the equity holders, the comparative cost of the private plan would be greater than shown in each of the cases. Therefore, depending on the revenue sharing agreement, the net cost to the government of the private plan could be higher than indicated here.

Finally, if annual net income from power sales fell below $110 million, the costs of both the plans would rise by the same amount, because the government would bear the cost in either event. Thus, the relative costs of the two alternatives do not change if power income is less than $110 million a year. 14/

14/ Again, this assumes that the actual power sales would be the same in both alternatives, even though the amount would be less than $110 million a year.

TABLE 3. SENSITIVITY ANALYSIS OF THE COST OF THE CRBRP (In millions of dollars)

Case a/	Discounted Present Value			Equity Holders' After-Tax Rate of Return
	Government-Financed Plan	BRC Plan	Difference b/	
(1) Ten-Year Depreciation	-1,105	-1,329	224	33.5
(2) Capitalized Construction Interest	-1,105	-1,341	236	27.2
(3) 7.5 Percent Government Discount Rate	-1,184	-1,352	168	36.8
(4) Joint Assumptions 1, 2, and 3	-1,184	-1,302	117	22.5
(5) Five-Year Sales to TVA	-1,413	-1,353	-59	36.8
(6) Reduced Power Sales and Five-Year Sales to TVA	-1,413	-1,430	17	36.8
Initial Base Case	-1,105	-1,353	248	36.8

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a/ For further explanation of the cases see text.

b/ The difference represents the comparative discounted cost of the private plan versus government financing. A positive difference indicates the private plan costs more than the public plan, and vice versa.

BRITAIN TO WORK WITH EUROPE ON FAST REACTOR DEVELOPMENT

Britain aims to join forces with a number of European countries on fast reactor development Mr Peter Walker, Secretary of State for Energy announced today (5 September).

Mr Walker said:

"The Government has decided to open formal negotiations to seek agreement on joint development of fast reactors with France, Germany, Italy, Belgium and the Netherlands.

"Britain is among the world leaders in the development of this technology but by seeking to join this European 'club' we expect to gain both technically and economically.

"Long term research programmes, such as fast reactor development, are expensive, but by working with our European partners we can reduce our costs by cutting out duplication, and share our considerable collective technical expertise.

"In November 1982 the Government reaffirmed its commitment to the fast reactor and asked the Chairman of the Atomic Energy Authority Sir Peter Hirsch, in consultation with the nuclear industry, to draw up a future development programme which would make the best use of the nation's resources and development.

"On the basis of this advice we have taken the decision to collaborate with our European neighbours because we shall get the maximum benefit for our own substantial programme if we pool our efforts with our European partners.

"France and Germany each have a substantial development programme and Italy, Belgium and the Netherlands have multilateral collaboration agreements with them.

"Clearly much has to await the outcome of negotiations but our choice of working with these European countries reflects our similarity of purpose and equivalent levels of expertise, but we are conscious that countries outside Europe, particularly the USA and Japan, are also experienced in this field.

"We are keen to keep open the possibility of extending this international collaboration outside Europe when the time is right."

Mr. OTTINGER. Madam Chairman? I wonder if we could have included in the record as well the CRS translation of a German article that explains how the Germans financed their plants. It's short.

Mrs. LLOYD. If it's short, without objection.

[The article follows:]

Congressional Research Service
The Library of Congress

Translation (German)

Washington, D.C. 20540

/Source: Atomwirtschaft, May, 1983, pages 221 following/

THE NEWS OF THE MONTH

May 1983: nuclear economy, nuclear technology

/excerpts/

The Federal government decides on the completion of the SNR and the THTR.

On April 26, 1983, on the recommendaton of the Federal Minister for Research and Technology (BMFT), the federal government decided on the completion of both the SNR-300 and THTR-3000 prototype nuclear power plants. It proceeded on the assumption of the pledged participation of EVU, of the producers and of Belgium and Netherlands (in the case of SNR) as well as of the Federal State of North Rhine-Westphalia (in the case of THTR). In the case of the SNR-300, the entire costs amounting to 6.5 billion DM are by now completely covered by additional federal funds of 697.5 million DM (as compared with the hitherto existing situation, see hereafter), by additional EVU grants of about 170 million DM, by 180 million DM from the producer and by an unconfirmed loan of 100 million DM. In the case of the THTR-300 the entire costs of 4 billion DM will be covered by additonal federal funds of 278 million DM, additional NRW funds of about 145 million DM and additional EVU grants of 79 million DM, by 30 million DM from the producer as well as by additional loans guaranteed by the Federation and the Federal State amounting to 450 million DM. The additional financing of both projects will be made by April 1983 beyond the intermediate financing of 250 million DM released for each of the reactors, already included in the previous itemization. The federal government expressly recognizes the new, considerably increased contributions by German electricity service and by the producer companies.

REASSESSMENT OF THE ADVANCED REACTOR SYSTEMS

In the Federal Ministry for Research and Technology (BMFT) the revaluation of advanced reactor systems of the fast breeding and high temperature reactors, which was initiated by former research Minister of the SPD/FDP coalition Dr. A. von Bulow, has been completed. Minister Dr. H. Riesenhuber will submit the report to the federal cabinet at the end of April or the beginning of May for a decision on the completion and putting into operation of both SNR-300 prototypes of nuclear reactor power plant in Kalkar and theTHTR-300 in Uetrop.

The BMFT report recommended they "lead to success the prototypes supported by the corresponsibility of business." It observed in this context that a realistic examination makes it possible to expect in the future a restrained but important role of the nuclear energy, which contains a considerable potential for advanced reactor systems, even if in the long run. In considering all the future potential and the need for additional expenditures we have to take into account that/the THRT-300 has already been up to 80% completed and the SNR-300 up to 70%. For this reason the adaptation of the development to long term factors for these projects is not possible, but only the alternative of either continuation or discontinuation. We can proceed on the assumption that the problematic time in which the State changed from the earlier intensive support to a temporary nearly reluctant toleration has by now passed (see the reservaton of the Bundestag towards the SNR-300 and its termination.) We can assume now. that the newest deadline and total cost estimate will be kept. For the SNR-300 the estimated total costs amount to 6.5 billion DM including 400 million DM reserves for any further price increase. Of this amount 5.35 have been so far approved or pledged.

The beginning of the test run is foreseen for November 1985, the transfer to the operator will take place in July 1987 after an initial operation period of 20 months.

For the THTR-300 total costs amount to 4 billion DM. Of this amount 2.9 billion DM have been granted or pledged previously. The reactor core shall be loaded in September 1983, whereupon the zero energy tests will follow. After mounting completion in the secondary part, the second partial operation license is foreseen for the summer of 1984. The output tests should start in the beginning of 1985, the transfer to the operators in October 1985.

/See: Atomwirtschaft April 1983, page 165./

The SNR-300 Costs

The total construction costs of the SNR-300 prototype nuclear power plant are estimated to amount to 6.5 billion DM in the new revalutiaon of the advanced reactor system in the Federal Ministry for Research and Technology, a revalution which was concluded in March 1983. In it is included a supplement of 400 million DM for the risk of further cost increases.

The present financial situation presents itself as follows (in millions of DM):

1. Up to now granted or (partially conditionally) pledged

BMFT	2,465.0
Investment supplement	572.0
Belgium	470.0
The Netherlands	470.0
KWU (maker)	120.0
SBK (operator)	266.0
EVU	988.0
Total:	5,351.5

2. At the beginning of March 1983, 4.4 billion DM were tied up through contracts, which were covered by the following pledges on allocations:

BMFT	2,365
Investment supplements	215
Belgium	333
The Netherlands	333
KWU (maker)	45
SBK (operator)	266
EVU	150
BMFT (Commitment authorizations submitted for later EVU payments)	695
Total:	4,402

3. Up to now it was paid of this amount:

BMFT	2,000.3
Investment supplement	264.9
Belgium	327.3
The Netherlands	333.0
KWU	20.0
SBK	200.0
EVU	132.0
Total:	3,277.5

The THTR-300 Advanced Reactor System Costs

In the revaluation completed in March 1983 by the Federal Ministry for Research and Technology (BMFT) the entire construction costs of the THTR-300 prototype nuclear power plant with a gas-cooled Kugelhaufen high temperature reactor are estimated to amount to 4 billion DM of which about 1 billion have not yet been covered by financial commitments. About 500 million DM should be raised by publicly guaranteed loans which will be paid back from the sale of electricity of the power plant, the rest by the participants (BMFT, North Rhine-Westphalia and industrial operator).

The present financial situation presents itself as follows (in million of DM):

1. Up to now granted or pledged:

BMFT	1,794
NRW	311
Investment supplement (for 4 billion DM total costs)	360
HKG (operator)	90
EVU (in a similar way to SNR participation)	158
BBC (producer)	165
Loan	60
Total:	2,938 billion

2. Amounts tied up through contracts as of January 31, 1983:

Consortium	2,118.0
HKG	329.0
First supply of fuel	73.
Total:	2,520.0 billion

3. These funds were obtained through:

HKG Common capital stock	50.0
Federally guaranteed loans	57.0
Federal subsidies	1,694.0
State subsidies	299.0
Investment supplements	224.0
Consortium owned shares	124.0
Financied contributions from VEW/ELEKTROMARK	27.0
Advanced financing from BBC/ HRB	45.0
Total:	2,520.0 billion

2,211 billion DM have been paid up to now. The producer and operator expect no further extra charges or delays. If nevertheless the delays should arise for instance because of the pending Administrative Court procedures, or because of the finding of/a solution for the disposal of nuclear waste, or because of the definitive operation authorization, their costs are estimated to amount to about 10 million DM per month.

Financing of the SNR-300

The April 26, 1983 decision of the Federal government for the completion of the SNR-300 prototype nuclear power plant with a fast breeding reactor rests on the financing draft arising from the numerous efforts and negotiations of the State and the industry, which accept the total costs for the construction as amounting to 6.5 billion DM. The contribution by business at the beginning of the project in 1972 amounted to 8% of the then estimated costs of 1.53 billion DM, rose by now to 28.5%. The total costs are distributed as follows:

	Million DM	about %
BMFT	3,162.5	48.5
Investment supplement	572	9
Belgium	470	7
The Netherlands	470	7
SBK (operator common capital stock)	265.5	4
EVU subsidies	1,160	18
INB/KWU (producer)	300	5
Loans (without guarantee)	100	1.5
Financial shortage	0	0
Total	6.5 billion	100

As a warranty for the observance of the henceforth determined deadline and costs framework a progressive proper participation of the producer was agreed to which amounts to 10% for costs between 5 and 6.05 billion DM; 30% between 6.05 and 6.3 billion DM, and 50% between 6.3 and 6.5 billion DM. The last stage of the total costs must be financed on purely industrial grounds together with the producer credit of 100 million DM to be taken over by the operator when the costs are between 6.3 and 6.5 billion DM within the 400 billion DM estimated cost risk provision.

For this reason no further regulations have been made for the excess of the total costs as estimated now.

For the operational stage the BMFT increased the existing risk participa- (under the participation of Belgium and the Netherlands) up to 500 million DM. The electricity sale revenues should cover the operational costs in a normal operation. The contracts for risk participation provide security for the premature discontinuation of reserves accumulation.

/See: Atomwirtschaft May 1983, pp. 221 and 222/

THTR-300 Financing

The April 26, 1983 decision of the Federal government for the completion of the THTR-300 prototype nuclear power plant with a gas-cooled Kugelhaufen-high temperature reactor rests on the financing draft already agreed upon with respect to the total construction costs of 4.0 billion DM. The business contribution which at the beginning of the project in 1971 amounted to 8% of the then estimated costs of 673 million DM rose (taking into consideration the 30% counter-security for the publicly guaranteed loans) to about 17%: The total costs are distributed as follows:

	Million DM	about %
BMFT	2,152	54
Federal State of North Rhine-Westphalia	456	11
Investments supplements	360	9
HKG (operator, common capital stock)	90	2
EVU subsidies	237	6
BBC (producer)	195	5
Loan (warranty from the Federation and NWR federal state)	510	13
Financing shortages	0	0
Total	4,000	100

For the new loan share to be taken up (390 million DM) HKG and BBC took over a countersecurity of about 30%. For the deadline warranty and cost framework a definitive upper limit was agreed upon with the producers for their own cost restitution sum. No provision was thus made for the excess of the total costs estimate at the present time.

For the operation phase the BMFT increased the existing risk participation to 450 million DM of which one third is taken over by the NRW Federal State. The formal approval of the federal State for the financing draft is still expected. Here also any kind of premature discontinuation of reserve accumulation is covered by risk participation.

See: Atomwirtschaft, May 1983, pp. 221 and 222

BMFT: Bundesministerium fur Forschung und Technologie
/Federal Ministry for Research and Technology/

KWU: Kraftwerkunion
/Power Plant Association/

SBK: Schnell-Bruter-Kernkfraftgessellschaft GmbH
/Fast Breeding Reactor Nuclear Power Plant Association, Ltd/

HKG: Hochtemperatur Kernkraftwerk GmbH
/High Temperature Nuclear Power Plant, Ltd/

BBC: Brown Boveri & Cie A.G.

Translated by
Casimir Petraitis
CRS - Language Services
8/3/83 - amc

Mrs. LLOYD. We are going to go back around to page 1 of our witness list today and call on Mr. James J. O'Connor, who's chairman of Breeder Reactor Corporation.

Mr. O'Connor, we are certainly happy that you are here today; if you will please come to the witness stand. We have your complete statement. It will be made in its entirety a part of the record and you may proceed as you wish, and we are awfully happy you are here with us today.

STATEMENT OF JAMES J. O'CONNOR, CHAIRMAN, BREEDER REACTOR CORPORATION

Mr. O'CONNOR. Thank you very much, Madam Chairlady, and members of the subcommittee. My apologies for not being on hand earlier when called. I left the room, I think, for 1 minute during the last 5 hours and called my office and found out there was an emergency.

Mrs. LLOYD. See, you got penalized.

Mr. O'CONNOR. I sure did. My apologies to you.

As Chairman of the Breeder Reactor Corporation, I am honored to appear before this subcommittee to represent the 753 electric power systems nationally from all sectors of our industry which support the Clinch River program .

The BRC is a nonprofit corporation which was formed in 1972 when the Federal Government invited our industry to join in the design and construction of the Nation's first large-scale liquid metal fast breeder reactor demonstration plant.

I use the word "invited" because the Federal Government at that time fathered the financing and construction arrangements.

The $325 million which is being contributed to the project by the Nation's electric utilities and others represents the largest contribution ever made by our industry to a single R&D project.

We made this commitment because we saw development of the breeder as necessary for achieving the full energy potential of the Nation's uranium resources.

This potential is several times larger than our Nation's combined resources of fossil fuels, and is one which can help to provide our Nation's electric power needs for the next century and beyond.

Moreover, we were convinced at that time, as we are now, that construction and test operation of Clinch River is the logical next step in the development of this technology.

In addition to my position with the BRC, I also am chairman and president of the Commonwealth Edison Co., which is the largest supplier of nuclear power in the country.

Our company, along with the Tennessee Valley Authority, is a party to the principal project agreements. As such, we are contributing managerial and technical expertise to the project over and above our financial contributions. This role has given us a unique opportunity to assess the technical aspects of Clinch River's design, about which I will have a little more to say in a few minutes.

You recently heard from Gordon Corey, chairman of the BRC financial advisory task force. This task force was convened in response to congressional concern about the level of future Federal budget appropriations for the project, and in response to a congressional charge to the U.S. Department of Energy, "to vigorously explore proposals including a reconsideation of the original cost-sharing arrangement, that would reduce Federal budget requirements for the Clinch River project or project alternative, and secure greater participation from the private sector."

The task force, in our judgment, has fully met the charge of Congress.

Mr. Corey has detailed a plan which can attract significant private investment in the project which we will—we do believe will reduce the Federal Government's financial obligations.

As we've heard already today, the task force plan for private financing would provide about 40 percent, or approximately $1 billion, of the DOE estimated remaining $2½ billion cost of completing the project. Because of the Federal R&D character of the project, this financing will require governmental assurances of project completion, its licensing and operations, and net revenues under the plan.

Private debt investments will be repaid out of sales of the project's eventual electric output, and private equity investors will have the right to share in any net revenues remaining after debt service and operating costs, as well as in any residual value of the plant. We fully endorse this task force plan.

For my part this afternoon, I will, (*a*)—and some of these things you've heard—report on the status of the project; (*b*), address the need to complete this national research and development effort from the utility perspective; (*c*), explain our continued role in project financing, and also discuss briefly the limitations which face electric utilities in this respect and; (*d*), urge the Congress to continue its commitment to breeder reactor R&D, including the completion of Clinch River.

About $1.66 billion will have been invested in the project at the close of the current fiscal year. Except for the delay costs attributed to the previous administration's efforts to terminate the project, this has been money well spent. As we heard, engineering and design is over 90 percent complete.

In our industry's opinion, design is not only up to date but contains many features which are at the leading edge of the world developments of this technology. More than 90—more than 70 percent of the plant's components have either been received or placed on order, at a cost of approximately $740 million. And I think it's important to point out that the remainder of the large-scale hardware that has been ordered is under fixed cost contracts, and that only a handful of items are so-called off-the-shelf items. So we have a pretty good idea of what the cost will be.

Mrs. LLOYD. Excuse me, Mr. O'Connor. Basically, in the areas where there could be cost overruns or cost uncertainties, we've most mainly crossed that bridge; is that not correct?

Mr. O'CONNOR. In our judgment, yes. As far as the major components of this plant are concerned, we have.

Mrs. LLOYD. So that our cost estimates in the future will not contain the variables they have in the past?

Mr. O'CONNOR. Inasfar as the cost of the components, yes. Delay is another factor. But as far as what the components will cost, that is correct.

Mrs. LLOYD. I'm talking about the cost of components and engineering.

Mr. O'CONNOR. That's right.

Mrs. LLOYD. Thank you very much.

Mr. O'CONNOR. A nuclear power stabilization agreement has been concluded with the building trade unions and we will hear about that in a few minutes from Mr. Georgine.

A construction permit from the NRC is expected this fall. All interventions in agency proceedings have either been resolved in the project's favor of withdrawn. The hearings for issuance of a construction permit were uncontested.

Permit me briefly to discuss the need for the project. The development of breeder reactor technology has been a national goal for 30 years. It is one of several current Federal R&D programs in our Nation's efforts to anticipate and meet America's future needs for electric power.

At present, the breeder option offers the most promise among the advance energy alternatives for application beginning in the early part of the next century. Yet, as we've heard, the United States is still several steps away from commercialization of this energy source.

Clinch River is the single most important step in that direction, and one that must be taken by the United States now if we are to be sure of having the breeder option available when it is needed.

The Clinch River project is the only technically acceptable, economical, and timely demonstration plant available to the United States for these purposes. Full system testing at Clinch River in a utility environment is essential to establish needed engineering benchmarks and to prove the ultimate practicality of the technology.

Without Clinch River, the LMFBR program, the LMFBR technology and, ultimately, even the nuclear option for future domestic power will be threatened and may be foreclosed from future generations of Americans.

Those of us who are responsible for meeting America's future energy demands believe that we have to have a high confidence strategy in this country. We must pursue scientific research on a broad basis and concentrate on developing those concepts within our Nation's grasp, such as the LMFBR.

To stop the project at this point would be wasteful, expensive, and shortsighted. And to do so would be a signal to the whole world that the United States is no longer serious about preserving a nuclear power option and reducing our long-term dependence on petroleum fuels.

Government involvement in the Clinch River project is not a subsidy to our industry, nor a betrayal of the administration's free market philosophy. On the contrary, it is a practical manifestation of the respective roles of Government and industry in a national R&D project. No one characterizes the space program as an industry subsidy, nor should Clinch River be considered as such. Indeed, the prime beneficiaries of the Clinch River project will be the U.S. public, not the nuclear utilities or our shareholders, who will receive no direct financial gain therefrom.

The project represents R&D having significant potential payback in commercial terms well into the future. But it also possesses important near-term advantages such as those involving long-range supply assurances and positive international benefits.

Estimates vary, yet even optimistic figures indicate the commercial breeder reactors will be unavailable until after the year 2010 even if current progress is maintained and the Clinch River demonstration project is completed on scheduled.

As Dr. Weinberg of the Institute for Energy Analysis at Oak Ridge observed in his testimony before Congress earlier this year, "If we have 50 years before breeders are needed on a large scale we do not have all that much time to wait."

Very briefly, Madam Chairlady, I would like to touch on the financial contribution of the electric utility industry.

Mrs. LLOYD. If you would, please, conclude your remarks, and very shortly.

Mr. O'CONNOR. All right, fine.

As I indicated earlier, the industry is contributing $325 million to the project. It was never intended as a match for Federal funding. As I said a minute ago, this is the largest R&D effort project we have ever undertaken in our industry.

I am sorry that we can't do more but we are effectively prevented by our Nation's system of State public utility commission regulation from making additional large contributions from ratepayers of R&D programs which have only very long-term payoffs.

[The prepared statement of Mr. O'Connor follows:]

STATEMENT

OF

JAMES J. O'CONNOR

CHAIRMAN AND PRESIDENT, COMMONWEALTH EDISON COMPANY
CHAIRMAN, BREEDER REACTOR CORPORATION

BEFORE

THE

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
U.S. HOUSE OF REPRESENTATIVES

SEPTEMBER 15, 1983

Madame Chairman, Members of the Subcommittee.

As Chairman of Breeder Reactor Corporation, I am honored to appear before this Subcommittee to represent the 753 electric systems nationwide from all sectors of our industry which support the Clinch River Breeder Reactor Project ("Project").

BRC is a non-profit corporation which was formed in 1972 when the Federal government invited our industry to join in the design and construction of the nation's first large-scale Liquid Metal Fast Breeder Reactor ("LMFBR") demonstration plant. The $325 million (including interest) which is being contributed to the Project by the nation's electric utilities and others include the largest contribution ever made by our industry to a single R&D project. We made this commitment because we saw development of the LMFBR as necessary for achieving the full energy potential of the nation's uranium resources. This potential is several times larger than our nation's combined resources of fossil fuels, and is one which can provide for our nation's electric power needs for the next century and beyond. Moreover, we were convinced then, as we are now, that construction and test operation of Clinch River is the logical next step in development of this technology.

Events of the past decade have underscored the importance of this Project and have reinforced the electric utility industry's conviction as to the need for timely completion of Clinch River.

In addition to my position with BRC, I also am Chairman and President of Commonwealth Edison Company. Our Company, along with the Tennessee Valley Authority, is a party to the Principal Project Agreements. As such, we are contributing managerial and technical expertise to the Project over and above our financial contributions. This role has given us a unique opportunity to assess the technical aspects of Clinch River's design, about which I will have more to say in a few minutes.

Gordon R. Corey, former Vice Chairman of Commonwealth Edison, will also testify today. He is serving as Chairman of the BRC Financial Advisory Task Force. This Task Force was convened in response to Congressional concern about the level of future Federal budget appropriations for the Project, and in response to a Congressional charge to the U.S. Department of Energy "to vigorously explore proposals including a reconsideration of the original cost-sharing arrangement, that would reduce Federal budget requirements for the Clinch River project or project alternative, and secure greater participation from the private sector." 1/

As Mr. Corey will explain to you in detail, the Task Force has fully met the charge of Congress. It has proposed a Plan which can attract significant private investment in the Project, thus reducing the Federal government's financial obligations.

Unlike most Federal R&D undertakings, the Project can repay a portion of its total cost. The Task Force proposes that this capacity to repay part of the cost be used to attract private investment and thus reduce Federal outlays. The Task Force Plan for private financing would provide forty percent -- or approximately one billion dollars -- of the DOE-estimated remaining 2.5 billion dollar cost of completing the Project. Because of the Federal R&D character of the Project, this financing will require governmental assurances of Project completion, its licensing, operation, and net revenues under the Plan. Private debt investments will be repaid out of sales of the Project's eventual electric output, and private equity investors

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1/ H.R. Rep. No. 980, 97th Cong., 2d Sess. 186 (1982).

will have the right to share in any net revenues remaining after debt service and operating costs, and in any residual value of the plant. Our industry fully endorses this Task Force Plan.

For my part this morning, I will:

- report on the status of the Project;
- address the need to complete this national research and development effort from the utility perspective;
- explain the industry's continued role in Project financing, and the limitations facing the electric utilities in this respect; and
- urge the Congress to continue its commitment to breeder reactor R&D, including completion of Clinch River.

Progress of the Project

About $1.66 billion will have been invested in the Project at the close of the current fiscal year. Except for the delay costs attributed to the previous Administration's efforts to terminate the Project, this has been money well spent. Engineering and design is now over 90 percent complete. In the industry's opinion, the design is up-to-date and contains many features at the leading edge of world developments in this technology. More than 70% of the plant's components have either been received or placed on order, at a cost of approximately $740 million. Preliminary site preparation activities are well under way. Over one million cubic yards of dirt and one-half million cubic yards of rock have been removed and preparation of the site has advanced to where construction can begin this fall.

A Nuclear Power Stabilization Agreement has been concluded with the building trade unions so that progress can proceed on schedule unimpeded by labor disputes. A construction permit from the Nuclear Regulatory Commission is expected this fall. All interventions in agency proceedings have either been resolved in the Project's favor or withdrawn. The hearings for issuance of a construction permit were uncontested.

By completing Clinch River, the U.S. will be well on its way to developing an effective breeder option for the twenty-first century, thereby acquiring a capacity to achieve the future energy independence that both our nation's economy and security require.

Need for the Project

The development of breeder reactor technology has been a national goal for more than 30 years. It is one of several current Federal R&D programs in our nation's efforts to anticipate and meet America's future needs for electric power. At present, the breeder option offers the most promise among the advanced energy alternatives for application beginning in the early part of the next century. Yet the United States is still several steps away from commercialization of this energy source. Clinch River is the most important step in that direction, and one that must be taken now if the U.S. is to be sure of having the breeder option available when it is needed.

The Clinch River Project is the only technically acceptable, economical, and timely demonstration plant available to the United States for these purposes. It is the focal point for the LMFBR base technology program. Component testing is important, but full system testing at Clinch River in a utility environment is essential to establish needed engineering benchmarks and to prove the ultimate practicality of the technology. Without Clinch River, the LMFBR base program, the LMFBR technology, and, ultimately, the nuclear option for future domestic power supplies will be grievously threatened and may be foreclosed from future generations of Americans.

Those of us who are responsible for America's future electric power supplies believe America must have a high confidence strategy. We must pursue scientific research on a broad basis and concentrate on developing those concepts within our nation's grasp, such as the LMFBR, with the most significant potential benefits. To abort the Project at this point would be irresponsible, wasteful, expensive, and short-sighted. To do so would be a signal to the whole world that America is no longer serious about preserving a nuclear power option and reducing our long-term dependence on petroleum fuels.

One has to wonder why we fail to pay the same regard to inner space as we do to outer space. For example, the fiscal year 1984 Appropriations Act for the National Aeronautics and Space Administration, Pub. L. 98-52, provides $5.9 billion in research and development funds; the House Committee on Science and Technology recommended that the Space Shuttle alone receive $1.6 billion, and the Space Lab $120 million.

These authorization bills typify the national commitment towards space research and development, which, like breeder reactor R&D, initially lacked a commercial character. As Representative Carney observed, "there is an attitude prevalent on [the Science and Technology Committee] that it is unpatriotic to question budget requests for space."[2] The growing gap between commitments for energy R&D and space R&D is difficult to understand, particularly in view of the parallels between the two programs.

Both breeder reactor and space R&D involve long-term and high-risk technological development of concepts for which government must assume primary responsibility. Private industry can carry the financial burden only as those concepts approach economic and commercial viability.

Both breeder reactor and space R&D have the potential to provide vast benefits; both directly, and through the spill-over effects which advanced R&D have for the nation's economy. Both breeder reactor and space R&D are intended to enhance the national well-being. They both look to the private sector ultimately to develop for commercial purposes the most promising elements of the advanced technology acquired. Unfortunately, however, our nation's advances in energy R&D have been falling well behind those which we have made in space.

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[2] H.R. Rep. No. 65, 98th Cong., 1st Sess. 210 (1983).

Government involvement in the Clinch River Project is not a subsidy to our industry nor a betrayal of the Administration's free-market philosophy. Quite the contrary, it is a practical manifestation of the respective roles of government and industry in a national research and development project. No one characterizes the space program as an industry subsidy, nor should Clinch River be regarded as such. Indeed, the prime beneficiaries of the Clinch River Project will be the U.S. public -- not the nuclear utilities or their stockholders, who will receive no direct financial gain therefrom.

The CRBR Project represents research and development having significant potential payback in commercial terms well into the future. But it also possesses important near-term advantages, such as those involving long-range supply assurances and positive international benefits.

The report of the Committee on Nuclear and Alternative Energy Systems (CONEAS) of the National Academy of

Sciences,[3] notes that "this intensive effort to develop and demonstrate breeder technology does not imply a corresponding commitment to deploying breeders." Nevertheless, if the very option to deploy the liquid metal fast breeder reactor is to be available to this country in the first half of the next century, a demonstration of current breeder reactor technology must proceed now. Clinch River will preserve the industrial infrastructure and workforce assembled and trained over the past three decades and upon which eventual deployment of the breeder reactor will depend.

Given the decades of lead time that will be required for the construction and operation of a commercial-size prototype and the ultimate commercialization of the technology, Clinch River must be undertaken now. Estimates vary, yet even optimistic figures indicate that commercial breeder reactors will be unavailable until after the year 2010, even if current progress is maintained and the Clinch River demonstration plant is completed on schedule. As Dr. Alvin M. Weinberg of the Institute for Energy Analysis at Oak Ridge observed in his testimony before Congress on

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3/ Energy in Transition 1985-2010 (Final Report of the Committee on Nuclear and Alternative Energy Systems, National Research Council), National Academy of Sciences.

February 23, 1983, "[i]f we have 50 years before breeders are needed on a large scale we do not have all that much time to wait."

The Department of Energy's Nonproliferation Alternative Systems Assessment Program,[4/] conducted over a period of three years at a cost of $23.5 million, reached a similar conclusion. Its 1979 report concluded that even with aggressive research and development and a timely demonstration project, the widespread commercialization of breeder reactor technology in the United States could occur no sooner than 2010. NASAP consequently urged completion of the demonstration plant at Clinch River, in order to avoid a further delay in the availability of the breeder option.

Financial Contribution of the Electric Utility Industry

Although the electric utility industry as a whole is contributing $325 million, including interest, to the Project, this contribution was never intended as a match for federal funding. As mentioned earlier, this is the largest R&D commitment ever made to a project by our industry.

4/ Nuclear Proliferation and Civilian Nuclear Power, DOE Report of the Nonproliferation Alternative Systems Assessment Program, Executive Summary, DOE/NE-0001, December 1979.

I regret that the electric utility industry is effectively prevented by our nation's system of State Public Utility Commission regulation from making additional large contributions from ratepayers in support of R&D programs which have only very long-term payoffs.

One reason for this is the fact that some areas of the country, and some companies, are more heavily involved in nuclear power generation than others. Thus, there is no feasible way through voluntary action to apportion financial responsibility for broad scale nuclear research and development facilities such as the CRBR project. Another reason is that utility rates have an extremely high profile, and since rate increases encounter great public resistance, utility commissions are loath to authorize contributions for large-scale development projects at consumer expense. Moreover, given the beleaguered financial condition of the electric utilities, it simply is unrealistic to look for larger contributions from stockholders.

If the industry consisted of only a few large systems with a more or less equal stake in nuclear power and without close and itemized regulation of rates, financing a project such as Clinch River would not be a problem. Similarly, if the electric power industry were nationalized, as in England and France, there is little doubt that the

Federal government would recognize that it could not fail to keep the United States at the forefront of nuclear technology, especially breeder technology. Notwithstanding these considerations, and indeed (in part) because of them, the government simply cannot afford to look at the problem of future energy sources from a short-term limited perspective. After all, it is the government to which the public must look to protect the interests of America's future generations.

While the electric utility industry is in no position to increase its monetary contributions, it remains anxious to do all it can to promote continuing development of this very promising concept. To this end, a number of individual companies and several electric cooperatives have indicated a willingness to purchase electrical output from the plant at their avoided costs. These commitments are a vital part of the Task Force Plan. The industry also recognizes that overseas collaboration may be essential to mitigating the high costs of the subsequent full scale demonstrations that will follow Clinch River. As we see it, Clinch River will give the U.S. unique technical information which will be critical to striking suitable multi-national collaborative agreements for sharing the cost of the larger near-commercial demonstrations that must follow this Project.

Need for Continued Congressional Support

Cooperation between the public and private sectors has produced large payoffs for consumers in the past, especially in the development of advanced technologies with great promise where the risks and costs are beyond the capacity of private industry to assume alone. Success has been particularly apparent in the area of civilian nuclear power. An example is the earlier cooperative effort between government and industry to develop the light water reactor, a technology which the Atomic Energy Commission developed in the 1950s and which the industry commercialized in the 1960s. Five billion dollars in government support for research and development have resulted in industry investment of 150 billion dollars, and immeasurable benefits to society in terms of energy cost savings, security and independence. Clinch River is a logical extension of this strategy.

Since the beginning of Clinch River, the electric utilities pledging their support for the Project have remained faithful to their commitments despite the past political controversies and uncertainties which have surrounded it. These utilities remain committed to seeing the Project through to completion. The current Congressional debate regarding continued funding of the Project will test the resoluteness of the government to fulfill its commitment to the national objectives which the Project represents.

Conclusion

In concluding, I thank you for permitting me -- on behalf of our nation's electric utility industry -- to report on our assessment of the progress to date, and to stress the continuing need for this vital national research and development effort. This nation has wisely committed itself to maintaining a nuclear option. The breeder reactor remains the keystone of that option as well as a symbol of our nation's commitment to a responsible energy strategy for the next century and beyond.

As a practical matter, it is our nation's only straight path to maintaining a nuclear energy option, attaining energy security, and sustaining economic strength.

Let me conclude by recalling President Reagan's remarks contained in his Nuclear Policy Statement of October 8, 1981:

> One of the best potential sources of new electric energy supplies in the coming decades is nuclear power. The United States has developed a strong technological base in the production of electricity from nuclear energy. I am directing that government agencies proceed with the demonstration of breeder reactor technology, including completion of the Clinch River Breeder Reactor. This is essential to ensure our preparedness for longer-term nuclear power needs.

Thank you.

Mrs. LLOYD. Thank you very much, Mr. O'Connor, for your very fine statement and your statement in its entirety will be made a part of the record.

Does BRC agree with the $1.5 billion figure for Federal appropriations, because this Congress will not provide any more should costs escalate?

Mr. O'CONNOR. We agree that the present program which calls for expenditures of $2½ billion to complete the project is a good estimate.

Mrs. LLOYD. Well, turning to the utilities commitment on this investment as well to supply their $175 million in utility contributions; is this a firm pledge of support—is there any question at all? Is there any question at all of their contributions to these funds?

Mr. O'CONNOR. There's no question if the Federal Government and the Congress authorizes the approval of this plan, that those commitments will be met.

Mrs. LLOYD. I think it's very important to this committee if you would really give us a little more detail on how BRC plans to fit into the new arrangements and the new financial plan. Will—will it—will BRC survive?

Mr. O'CONNOR. BRC will survive but primarily we as a conduit to draw the funds from the utilities to make sure that the pledges are paid, and that money will be transferred to the project.

Mrs. LLOYD. So you will be a transfer agent to——

Mr. O'CONNOR. That's correct.

Mrs. LLOYD [continuing]. To apply the funds as well.

Well, who's going to own the new American Energy Development Corp.?

Mr. O'CONNOR. Well, there will be a—it will be a Government project, but a partnership, a joint venture.

Mrs. LLOYD. Mr. Corey, would you like to address this question as well?

Mr. O'CONNOR. And the ownership.

Mrs. LLOYD. And the ownership.

Mr. COREY. On the ownership, we have been holding off issuing stock in the company until we found out what happened—would happen to this legislation. The company as it stands today, is essentially a corporation which has been established in name. I am acting as chief executive officer but the corporation isn't doing anything, we're waiting. And what we will do is to solicit funds from anyone in the nuclear community that's interested in becoming a stockholder in the firm. It may be——

Mrs. LLOYD. And there will be no conflict of interest?

Mr. COREY [continuing]. Utilities, may be manufacturers, may be suppliers, may be others.

Mrs. LLOYD. As you know, I——

Mr. COREY. It will be completely private.

Mrs. LLOYD. Thank you very much. As you know, I live in the TVA area and five of our plants have been cancelled in this region and, of course, I know there was an overestimate of demand and then the cost of the plants began to accelerate.

Is there a need for the CRBR generated power with this backdrop, Mr. O'Connor?

Mr. O'CONNOR. In our judgment, there is a need. And it's really an insurance policy against a future possibility that things can change. As we've heard all throughout the day, we've heard estimates from 1972 of what load growth would be; 1979, the CONEAS report; estimates to date.

But the important thing is that we can measure what the cost of going ahead with this project is approximately at a billion dollars. But what's very hard to measure is the incalculable consequence of not having energy in the event, from the breeder, in the event we might need it in the 21st century.

Mrs. LLOYD. In other words, we are going back to the concept this is an R&D program?

Mr. O'CONNOR. That's correct. But it poises us to take advantage of the commercialization of a new energy source which gives us a lot of protection well into the 21st century. And having gone as far as we have with this project, it would be a shame to turn back now and not complete it.

Mrs. LLOYD. Well——

Mr. COREY. Madam Chair—Chairwoman, may I say something?

Mrs. LLOYD. Please, Mr. Corey.

Mr. COREY. I have observed throughout most of the morning there was a repeated discussion as to whether there was really need for power into Southeast, or need for power in Texas, or need for power in the middle south area. We did not base any of our economic projections on the assumption that we would get any compensation for capacity. And as long as—as long as there is a 150-million kilowatts of capacity in load in the southeastern region, don't worry, we can find some place to sell the 350,000 kilowatts that Clinch River will produce and it will simply replace oil.

Mrs. LLOYD. And this is not of a magnitude to—of concern——

Mr. COREY. We haven't—we haven't assumed any capacity needs. We haven't—we have assumed that the whole thing can remain flat and we can make this project pay for itself.

Mrs. LLOYD. Thank you so very much.

Mr. Brown?

Mr. BROWN. Mr. O'Connor, I think when you say there's a need for the energy and from Clinch River, you are speaking in generic terms of the—of our broader need for breeder reactors as a source of energy, and Clinch River as being an essential element in the development of this program, you are not claiming any shortage of energy in the region, are you?

Mr. O'CONNOR. No, we are not.

Mr. BROWN. Yeah.

Mr. O'CONNOR. No, sir.

Mr. BROWN. With regard to the plants which have always existed for the continuation of a breeder commercialization program, do you see any alteration in the time schedule for that? As you know, Clinch River was to be a step in—it was to be followed by an additional upgrading larger size thousand megawatt or something like that. Then a series of four or five commercial plants to come on rather quickly in succession.

Would you comment on the need for following that kind of a schedule at the present time?

Mr. O'Connor. I think, Congressman, it will depend a lot on what the picture looks like when we conclude this plant as to what the urgency is attached to going to the next step.

But it certainly is envisioned that following this demonstration plant that we would go on to the follow-on breeder at a much larger size.

Mr. Brown. A Superphenix size, roughly.

Mr. O'Connor. Perhaps, yes.

Mr. Brown. Uh, you heard the testimony of the French representatives—their plans to go ahead with a series of larger commercial plants seemed to be delayed at the present time and that's in the setting of the French where they have a much higher reliance on nuclear than we do; wouldn't you perceive a similar kind of a delay in our proceeding with a series of breeder plants of commercial size?

Mr. O'Connor. Not necessarily, looking off into the future, while the percentage of power output is higher than ours is, you must remember that we have a number of nuclear powerplants in this country.

Now, as Mr. Corey indicated, over 40 percent of our output on Commonwealth Edison is from nuclear. And by 1986, that will be up to 75 percent.

Mr. Brown. But you are an exceptional company.

Mr. O'Connor. Well, nuclear power today accounts for about 13 percent. In another 15 years it will be about 26 percent.

Mr. Brown. All right, let's——

Mr. O'Connor. But is growing in terms of total numbers.

Mr. Brown. Let's examine that. We know it's growing; we hope it will continue to grow for a healthy industry, but do—do your projections, as far as you have any information, indicate that there will be any shortage of uranium and any rapid escalation of uranium prices to the hundred dollar a pound or whatever it is that makes breeders competitive with light-water reactors?

Mr. O'Connor. Congressman, I think our biggest problem is dealing with uncertainty. Eight years ago nobody would have thought that uranium would have gone down in its price from——

Mr. Brown. What is it today?

Mr. O'Connor. From $40 to $25, roughly. Everybody was predicting that it would go higher. The problem is we are dealing with the future and a lot of uncertainties. And our hope is that by exercising and advancing this important option we will be in a position to take—to eliminate a lot of those uncertainties.

Mr. Brown. Well, I respect the argument that it preserves an option but I think the question is one of economics and timing as to protecting that option. And I recognize that this doesn't give you a chance to paint it in sheer black and white, which I've never thought we could. But I really question whether there would be any economic advantage from going ahead with a full-scale commercialization with cheap uranium available.

You are not contending that the breeder is going to produce cheaper electricity under current circumstances, are you?

Mr. O'Connor. No, I'm not. And I tried to suggest earlier that I think we have to look at that decision when this plant is completed. I think that's the timeframe in which to determine just how far we should go.

Our big concern is having come so far over the last decade and we don't wish to lose what we've developed.

Mr. BROWN. Well, I—I get the feeling from both your argument and a number of others, and I respect the argument. That—that basic argument is we are so far along we shouldn't stop. But that didn't persuade TVA from cancelling five reactors, did it?

Mr. O'CONNOR. I think that's an entirely different area. The reactors that were canceled were the light-water reactors. This is the plant that's, you know, as we indicated, over 90 percent designed; over 98 percent of the R&D work has already been done. It's poised to begin construction.

The main thing is that we think that it has a great potential to add significantly to an option that we may need to call on in the 21st century.

Mr. BROWN. Thank you.

Mrs. LLOYD. Mr. Young, have you any questions?

Mr. YOUNG. No questions.

Mrs. LLOYD. Thank you very much, Mr. O'Connor, for being with us. We certainly appreciate your testimony. We appreciate you waiting. And, Mr. Corey, we thank you also for being with us again.

Mr. O'CONNOR. With your permission, Madam Chairlady, I would like to have for the record a copy of my formal statement as well as a copy of the March and the June reports that were filed and finally some photos that you might find of interest that deal with the present status of construction.

Mrs. LLOYD. I believe you have a copy of those——

Mr. O'CONNOR. We have those.

Mrs. LLOYD [continuing]. Such as I have that I happened to have the privilege of being in Oak Ridge this very special day last Saturday. Without objection, they will—without objection, so ordered.

Mr. O'CONNOR. Thank you.

Mrs. LLOYD. They will be made a part of the record.

Thank you very much for being with us.

[The documents follow:]

BREEDER REACTOR CORPORATION
P.O. BOX 767, CHICAGO, ILLINOIS 60690

March 12, 1983

Mr. Wallace B. Behnke
Chairman
Project Management Corporation
Post Office Box 767
Chicago, IL 60690

Hon. Donald Paul Hodel
The Secretary of Energy
Department of Energy
Forrestal Building
1000 Independence Avenue, SW
Washington, DC 20585

Gentlemen:

As you know, Breeder Reactor Corporation, as part of its responsibility to provide senior counsel to the Clinch River Breeder Reactor Project ("CRBRP"), has assembled a task force to explore possible alternative financing possibilities for supplementing future Federal appropriations supporting the construction and operation of the Project.

Within the few weeks available, the task force considered future financing options based on possible values of the plant, its revenues, the values of possible tax credits, and other values. A report on the results of the consideration of these issues by the task force to date is enclosed for your information and use.

In forwarding the task force report along with a number of my personal observations, I would like to point out the preliminary nature of the studies undertaken by the task force and the absence of that type of detailed review at this stage that would normally be attendant to such transmittals. Because of a desire to provide information in a useful form in a brief period of time, the task force has had limited opportunity to exchange comments and ideas with others. The task force report has not yet been reviewed by the BRC Board of Directors or the organizations they represent, but is being transmitted to the Board herewith.

The task force recognizes that there are many risks and uncertainties involved in determining the market value of a first-of-a-kind demonstration project such as the CRBRP at this stage of its development. They relate to licensing, plant completion, testing and operation, the potential market for the plant's electricity, competition for funds and other government resources and other issues. The task force is well aware that additional guidance from the utility industry, the nuclear equipment industry, the financial community, and government will be required to permit the exploration in more detail of the potential impact of such considerations on possible financing options.

There are a number of ways in which financial assistance could be provided. However, experience with each of these options on other projects suggests that further meaningful development of the most promising options for this Project depends on the government's role and its commitment for the long term to the CRBRP and to the nuclear power policies and programs tightly interwoven with this Project.

The BRC Board of Directors has frequently reaffirmed its position that the CRBRP is a unique project of great national value, warranting continued industry support and DOE's highest priority for available Federal funding and other support. Among its responsibilities to this Project, DOE has an obligation under current Project arrangements to continue to seek sufficient Federal funding to see the Project through to completion. As the task force report points out, access to private financial markets for supplemental funds will require a complex of government commitments and assurances.

Much of the criticism and debate concerning the CRBRP is now structured around the financial consequences of the delays which have plagued the Project. These delays are largely the result of changing and conflicting Federal policies and plans and organizational and financial decisions, along with the extraordinary inflationary pressures which affected the economy for several years. These are matters over which the utility and industrial participants in the Project have had no control.

The Project's managers and the industrial base have performed remarkably well in areas within their control, despite extended delays in licensing and construction, the Project's first-of-a-kind development characteristics, and the impact of the Three Mile Island accident on new licensing requirements by the NRC. Project design is almost 90% complete.

Major components, both completed or on order, total $740 million, representing about 75% of the major nuclear components. Site preparation work is well underway. More than $1.5 billion has already been invested in the Project.

I understand that more than 3,500 government and contractor employees throughout the United States are currently working on the Project, including highly skilled scientists and engineers, factory workers, and construction trades personnel, and that the Project includes a significant commitment to minority contracting and minority employment. Moreover, because of its advanced stage of design, proceeding to full-scale construction will permit the employment of several thousand additional personnel.

The task remaining is to complete the design and construct and operate the plant to demonstrate the practical characteristics of breeder technology.

BRC is convinced that demonstration of the Liquid Metal Fast Breeder Reactor (LMFBR) technology is essential to its continued development. The CRBRP has evolved from costly, but productive, engineering investments by both government and industry since the 1950's. The national LMFBR research and development program has confirmed the technical and engineering feasibility of the LMFBR concept and the CRBRP. A well-documented technological base has been reinforced by a well structured, experienced industrial base building on the government's scientific and laboratory resources and the guidance of the nation's utilities. Operation of the Experimental Breeder Reactor II, the successful start-up and full-power operation of the Fast Flux Test Facility (FFTF), increasing confidence in nuclear fuel performance and knowledge of key technology-related safety and licensing matters have contributed to increased engineering confidence and have helped reduce the R&D and first-of-a-kind risks in the CRBRP design. Nevertheless, uncertainties remain.

Further progress in the LMFBR program requires, first, maintenance of industry confidence that the CRBRP can be completed and successfully operated. Primary attention can then be directed to arrangements for the design and construction of a utility-sized demonstration plant. Information gathered from the FFTF and the CRBRP will not only be essential to the design of a larger plant, but will also enhance the ability of the U.S. to enter into meaningful international collaboration for further development of the LMFBR.

The overall LMFBR program, and the role and responsibilities of government and industry within that program, are patterned after the successful experience with Shippingport, Dresden, Yankee and other major nuclear projects in the AEC's Power Reactor Demonstration Program. DOE publications show estimated government expenditures for Light Water Reactor (LWR) plant research and development and fuel cycle support at about $5 billion. I understand that at this stage the private sector has invested well over $150 billion and committed billions more to carry this LWR technology from the demonstration plant phase into the commercial introduction and deployment phases. Over the past ten years, consumers have saved about $25 billion because the LWR option has been available to the nation's electric utilities.

The nation is on the right track in building up and integrating a technological, engineering, industrial, and construction force infrastructure and demonstrating its practicality in careful steps before proceeding to commercial introduction of the LMFBR concept. In addition to the $1.5 billion already invested in the CRBR Project, countless other investments in dollars, time, facilities, and technology in the industry and in the base R&D program would be placed in jeopardy or lost, if a decision were made to further delay or cancel the CRBRP at this stage. If a decision were made to continue to carry out a strong breeder program without the CRBRP, the cost to the nation would certainly be much greater than presently required. No better nor more economically realistic alternative has been proposed and supported in a meaningful manner.

For more than thirty years, every President, every Congress, and the industrial and scientific community have supported the premise that this nation must have viable domestic energy options to support our economy, our security, and our ability to maintain effective domestic and foreign policies. Events within the past ten years, here and abroad, provide ample justification to move forward with a sense of urgency to achieve these objectives. Studies of viable domestic alternatives have confirmed that nuclear power must continue to play a major role in achieving these national goals. One of the most critical elements of the nuclear option is the government's long-standing commitment to the expeditious development and demonstration of the LMFBR to permit the private sector to make market decisions regarding its future commercial development.

The following points, which have emerged from a review of assessments of our domestic energy options by government, industrial, and scientific bodies, impress me as vital in the context of our nation's nuclear power program:

> At this stage, a decision not to sustain a strong national breeder program would imply the phasing out of nuclear fission as a domestic energy source.
>
> If the future role of nuclear power is viewed as uncertain, but a nuclear option is to be maintained, constructing and operating a breeder demonstration plant is necessary.
>
> Such a demonstration plant is an integral and key element of the breeder research and development program; no commitment to build commercial breeder plants could possibly be considered or made unless and until the construction and operation of such a demonstration plant have been evaluated.
>
> The CRBRP is the only technically acceptable, economical, and timely demonstration plant available.

America must retain and develop all of its few promising long-term energy sources, including breeder reactors. Events during the past decade of turbulence in energy supplies have confirmed the wisdom of the decisions which led to planning for the CRBRP and have reinforced the need for its aggressive completion. The Project warrants the highest priority for continued support by government and industry.

National security, industrial strength, and economic well-being all require adequate and reliable supplies of electrical power at reasonable rates. Long-term projections for economic recovery dictate that the nation must have demonstrated electric energy supply options to support long-term growth. At present, only coal and nuclear fuel can be relied upon to fulfill these bulk power needs in the foreseeable future.

Congress has committed a substantial sum, over $18 billion, and authorized the formation of special government-industry institutional arrangements in an important effort to stimulate the development and demonstration of domestic synthetic fuels technologies by the private sector. While a smaller financial commitment will be required for the breeder, a comparable national commitment to further development and demonstration of the LMFBR technology is essential.

I hope that the task force submittal along with my comments will help encourage constructive attention to the completion of the CRBRP and to the serious national energy R&D issues which are focused on the Project.

Sincerely yours,

James J. O'Connor

James J. O'Connor
Chairman

cc: BRC Board of Directors

EXPLORATION OF ALTERNATIVE FINANCING POSSIBILITIES FOR THE CLINCH RIVER BREEDER REACTOR PROJECT

A task force report to the Breeder Reactor Corporation on alternative financing possibilities for the CRBR Project.

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March 12, 1983

HIGHLIGHTS OF THE BRC TASK FORCE REPORT

- The CRBR Project can attract significant new-source capital funds, perhaps as much as forty percent of the $2.4 billion remaining cost to complete.
- Some of this can be provided by capitalizing on the value of the Project through firm contracts for its power output, supported by appropriate Federal assurances.
- The amount of private investment will be enhanced by assuring the availability of conventional Project-related tax incentives.
- Sufficient and timely funding must be provided to maintain optimum construction schedules; vigorous efforts must be continued to prevent slippages and unnecessary cost increases. This will require prompt action by Congress, DOE and the private sector.
- Further schedule delays cannot be tolerated because of their effect on costs.
- Legislation will be needed to assure timely Federal support and to amend the existing Project authorization so as to permit requisite Federal assurances with respect to completion, licensing and operability of the Project.
- One way to facilitate private financing would be to create a new entity, possibly a joint-venture, with a Federal corporation or agency as general partner and private investors as limited partners. The financing framework would be similar to that used for any large construction partnership in that tax benefits could be allocated among the partners.
- No single approach or set of alternatives is recommended. The Task Force stands ready to assist in determining how best to proceed.

March 12, 1983

REPORT OF THE CLINCH RIVER BREEDER REACTOR PROJECT TASK FORCE

Overview

This report describes a number of possibilities for minimizing Federal budget requirements for the Clinch River Breeder Reactor (CRBR) Project and securing greater participation from private investors. It concludes that significant new-source funding can be secured for the Project if Federal efforts are clearly centered on the twin goals of completing the Project promptly and providing the kinds of firm assurances and tax benefits which private investors generally require for a project of this magnitude.

General Background

On December 3, 1982, at a meeting of the Breeder Reactor Corporation (BRC) Board of Directors, James J. O'Connor, Chairman of the Board, authorized the assembly of a Task Force to make an objective examination of alternative financing possibilities for the CRBR Project. The Task Force includes representatives of the electric utility industry and investment banking community with legal and technical advisors. Its formation, which is based upon BRC's responsibility to provide "senior counsel to [Project Management Corporation] PMC in the interests of the Project" (BRC/PMC Agreement, Article XIV(c)), was in response to Congressional concern about the level of future Federal budget appropriations for the Project as expressed in a Senate Appropriations Committee report. Later in December, Congressional Conferees approving fiscal year 1983 funding for the Project required the U.S. Department of Energy "... to vigorously explore proposals including a reconsideration of the original cost-sharing arrangement, that would reduce Federal budget requirements for the Clinch River Project or project alternative, and secure greater participation from the private sector." (H.R. Rep. No. 97-980 at 186, 97th Cong., 2d Sess., 12/20/82.) The DOE was directed to submit its findings to the cognizant Congressional committees not later than March 15, 1983.

In view of the action of the Conferees, the Task Force is submitting the following report, exploring possible Project financing proposals, to BRC.

The membership of the BRC Task Force was established in January, 1983. Its first meeting was held late that month. In carrying out its task, the Task Force consulted with outside financial and banking experts, some corporations involved in the Project, and the DOE. The limited time available prior to March 15 has necessitated a broad definition of alternative proposals rather than detailed specification of precise institutional vehicles, statutory changes and contractual terms that must ultimately be developed when the DOE, the private sector and the cognizant Congressional committees determine the preferable course to follow in order to assure, to the extent possible, the continued progress of the CRBR Project towards final design, construction and operation.

Several guiding principles underlie the Task Force's approach to the issues presented by alternative financing proposals. These include the following:

- The CRBR is essentially a national research and development effort and an important part of the National Liquid Metal Fast Breeder Reactor (LMFBR) program.

- The CRBR Project can result in an electric generating facility with significant marketable value and output. However, there are far too many uncertainties relating to its licensing, construction, completion, and operation to be financed independent of Federal financial aid and legislative and administrative support.

- The CRBR Project, if successful, will not be available for the sale of power until 1990. Projections of costs and revenues at that point and for up to 30 years thereafter are necessarily speculative and uncertain. Thus, the estimates presented in this report (based on information provided by DOE) should serve only as a general guide for the purpose of estimating future financing requirements.

- The existing Project arrangements were worked out with great care and have established rights and obligations which should not be disregarded in assessing alternative proposals. Such proposals should complement the present contract arrangements to the extent possible.

- The Task Force has not offered political assessments of alternative proposals, but has assumed favorable legislative action to support reasonable financial alternatives designed to "reduce Federal budget requirements."

Risks, implications and uncertainties involved in determining the ultimate degree of reliability of this first-of-a-kind developmental project and the market value of its output have not been dealt with exhaustively. These uncertainties include those relating to licensing, back-fitting, completion, testing and operation; the R & D role of the Project; the potential market for its electrical output; and the need to compete for Federal funds and other Government resources. A great deal of additional guidance from the electric utility industry, the nuclear equipment industry, the financial community and the Federal Government will be required to estimate the future commercial value of the Project with the degree of certainty needed to determine precisely how much capital can be raised from private investors.

The detailed findings of the Task Force are set forth in the following sections.

I. Cost to Complete

Under the May 4, 1976 Project Agreement, the DOE is obligated to use its best efforts to obtain from Congress whatever additional funds are needed to complete the Project and demonstrate the technology.

The Task Force was asked by BRC to explore alternative sources of Project financing and to advise BRC whether such alternative sources, when coupled with continuing Federal appropriations at roughly present levels, will be adequate to complete the Project. The Task Force did not make an in-depth examination of the Project schedule and costs, but was provided with DOE's latest construction schedule and cost estimates which indicate that the CRBR Project can be completed by October 1989 at an estimated remaining expenditure of $2.4 billion after FY 1983. These estimates assume that the construction schedule is not constrained by further funding limitations. Thus, the completion date and remaining expenditures are highly dependent upon resolution of existing funding uncertainties. If the construction schedule were to slip, the estimated remaining cost to complete the Project could increase significantly.

For purposes of this report, the Task Force accepted DOE's estimate of $2.4 billion to complete the Project, assuming that further delays will be avoided; and recognizing that this assumption (and, hence, the cost estimate itself) depends upon prompt actions relating to the resolution of Project funding.

The deleterious effect of delays. It is enormously costly to delay or stretch out any large construction project, particularly a large R & D project, such as the CRBR Project, due to additional carrying charges during the delay period, escalation of construction costs, and added expenditures associated with using less than optimal construction forces. Members of the Task Force have had direct experience with such delays and, accordingly, all of the projections in this report assume prompt Federal action, including timely future funding by the Congress, so as to permit optimal work scheduling from this point on. Absent these, the conclusions of this report cannot be supported.

II. New-Source Funding Needs

Future contributions from the electric utility industry, already committed, will provide $172 million, and other contributors will provide $5 million, for total future contributions of $177 million. While part of these contributions are scheduled to be made after FY 1991, it is assumed that all such amounts can be made available for funding Project construction plus interim financing costs, to the extent they must be paid currently.

Assuming minimum future Federal funding at roughly current levels for a total of $1.4 billion subsequent to FY 1983, the additional amount required to be provided from new sources, in order to fund total Project costs, would be about $800 million, as shown in the following table:

TABLE I
REMAINING CAPITAL REQUIREMENTS

	Billions
Federal funding	$1.4
Utility contributions and others	0.2
New-source funding required	0.8
Total funds needed	$2.4

Adding a modest allowance of $300 million for those out-of-pocket financing costs which must be paid during the construction period, an estimate of $1.1 billion seems reasonable for the Project's future new-source funding needs, but this amount can vary widely, depending upon the financing plan selected.

III. New-Source Funding Requirements Exceed the Probable Proceeds of a Sale of the Project Itself

The maximum future market value of the CRBR Project, measured in terms of the likely avoided cost of constructing alternative coal-fired units equipped with scrubbers, is not expected to exceed $2,300 per KWe.*

If the 330 MWe conservative net rating of CRBR were priced at $2,300 per KWe, the result would be $750 million. If the 380 MWe design net rating were priced at $2,300/KWe the result would be nearly $900 million. However, the facility is worth less than that today because achievement of a commercial level of reliable operation is at least nine years away. Moreover, steps must be taken to reduce completion risks and the like before Bankable** securities can be sold and full market value realized.

IV. Power Sales Constraints

Studies show a probable need for additional electric generating capacity in the SERC region in the early to mid-1990s. However, utilities in that region may be reluctant to assume certain risks associated with long lead-time commitments for CRBR power, namely:

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* Generation in the Southeastern Electric Reliability Council (SERC) Region, outside of Florida, is predominantly coal-fired. The $2,300 figure is derived from a range of estimates available from several sources for base-load coal-fired capacity installed in the SERC region for commercial service in 1992 (the earliest date at which commercially reliable output is expected to be available) -- in short, ten years hence -- and using annual cost escalation rates in the 8% to 9% range.

** The terms, "Bankable" and "Bankable Commitments", as used herein, mean that the contract or obligation in question is sufficiently firm to provide adequate security for a non-recourse loan, advance, leasehold investment, or equity participation.

- projected load growth in the SERC region may not materialize;
- the level of power revenues needed to pay Project debt service and other financing costs may exceed the purchasers' "Avoided Costs;"* and
- the Project may not be able to produce the power contracted for.

Regulated electric utilities tend to be inhibited from making risky long-term capacity commitments because the regulatory penalties for over-commitment are severe. In view of the possibility that such penalties might be imposed, regulated utilities in the SERC region may be reluctant to enter into long-term obligations today (i) to purchase minimum annual quantities of CRBR power, or to purchase the Clinch River Project itself (or the Balance of Plant, i.e., the Project excluding the Nuclear Steam Supply System) because anticipated load growth might not materialize; or (ii) to pay a specific minimum price for CRBR power because that price might prove to be in excess of their systems' Avoided Costs.

Nevertheless, the Task Force is confident that, if appropriate arrangements are developed, such reluctance can be overcome. However, the very existence of such reluctance is evidence of the need for the kinds of assurances deemed essential, as discussed below.

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* "Avoided Costs" is a technical term derived from Section 210 of the Public Utility Regulatory Policies Act (PURPA). Section 292.101(b)(6) of the regulations implementing that Act defines "Avoided Costs" as follows:

> "(6) 'Avoided Costs' means the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the . . . qualifying facilities, such utility would generate itself or purchase from another source."

The PURPA regulations generally provide that electric utilities must pay full avoided costs for electricity generated by small power producers and cogenerators.

V. Range of Possible Market Values

The CRBR Project will have significant potential market value when completed and the plant is operating as a base-load electrical power plant. Realization of that value prior to the end of the shakedown period (now scheduled for mid-1992) will depend upon unconditional Federal assurances, as discussed below. Such realization may be accomplished in a variety of ways, as follows:

- sale of the Project,
- sale of the Balance of Plant (BOP), accompanied by a viable steam supply contract, and
- pledge of the future revenue stream.

Sale of the Project. As a practical matter, it would be difficult to sell the entire Project today (or to sell securities approaching its full value) because the accident at Three Mile Island and the controversy surrounding the Washington Public Power Supply System (WPPSS) nuclear program have left investors leery of large nuclear power plant projects, whether or not they are backed by apparently firm governmental assurances. This suggests that the inherent value of the plant itself would have to be supplemented by a long-term power sales agreement backed by an unconditional Federal warranty of minimum revenues.

Setting aside, for the moment, the value of the revenue warranty, it is reasonable to assume that the Project itself may ultimately be worth as much as the coal-fired capacity which would otherwise have to be built. Applying the $2,300 per KWe figure already mentioned to the full 380 MWe net rating of the Project indicates that the maximum capacity value of the Project may, in 1992, approach $900 million. The tax benefits normally associated with plant construction and ownership would provide additional value which, however, cannot be quantified at this time.*

Sale of the BOP. The BOP would have little market value without an assured supply of steam. A contract to supply such steam at an assured price per Kwh would be essential if the BOP were to be sold for a significant amount. A long-term power sales agreement backed by Federal assurances would also be required. The amount for which the BOP could then be sold would depend, of course, upon the terms of those two contracts. Assuming that the steam contract were designed to maximize the value of the BOP, then the BOP might be sold for a significant figure, not because of its replacement value in terms of turbine generator, condenser, switchgear and the like, but because of the value of the future net revenue stream (after deducting steam supply costs), coupled with construction-related tax benefits already referred to.

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* There should be no net loss to the Government through the use by CRBR of existing construction-related tax benefits. This is because any such benefits used in connection with the CRBR will displace those that would otherwise have applied to new capacity displaced by CRBR.

A simple pledge of the warranted future revenue stream. The value of the future power output of the Project will vary depending upon the amount of assured output and the net revenue per Kwh available to cover debt service and equity return. For example, minimum net revenues of 6¢ per Kwh (after deducting fuel, other operation and maintenance expenses) on an assured annual output of two billion Kwh for 20 years beginning in 1992 would provide $120 million a year, an amount adequate to pay the debt service (and equity return), at an assumed 10% annual cost of money,* on approximately $1 billion invested in 1992 -- $1,020 million. A minimum net price of 6¢ per Kwh does not seem unreasonable for the 1990s and thereafter, in terms of Avoided Cost projections for SERC region utilities which have committed their 1990s capacity needs. However, bus-bar electricity cost projections from new coal-fired units in the SERC region for the 1990s and thereafter are in the 15¢ per Kwh or higher range. If net revenues pegged at this level or modestly lower could be assured through firm DOE contracts, significantly larger amounts could be provided.

It should be emphasized that to be Bankable, the power contracts must be the hell-or-high-water type. In short, they must guarantee the payment of annual dollar amounts adequate to cover financing costs no matter what happens.**

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* The precise interest rate applicable to the financings referred to above and hereinafter would depend upon market conditions when such financings were arranged. In today's market, a 10% annual rate is on the optimistic side. However, other assumptions set forth herein tend to be on the conservative side.

** With moderate economic growth over the long-term, new capacity is expected to be required in the SERC region. Thus, while firm utility contracts to purchase power at displaced capacity rates will be difficult to achieve in the near term, as future capacity needs become clear such contracts may be forthcoming. Thus, while Federal revenue assurances will be needed in the near term, the Government might not have to pay on such assurances unless, of course, the expected economic growth and capacity requirements do not materialize when needed.

In setting forth the foregoing range of 1992 values, the Task Force avoided pinpointing a precise value because it will depend upon the character of the arrangements provided. However, several relevant observations can be made:

(1) It appears that the market value in 1992 (for investment purposes) may be in the range of $1 billion.

(2) If the Project or the BOP is purchased by investors, the investment value can possibly be enhanced through conventional construction-related tax benefits, viz, those associated with amounts invested in newly-constructed depreciable property.

(3) The amount of funds which can be made available to cover actual construction expenditures will vary widely depending upon when the money is actually invested. For example --

- The proceeds of a $1 billion investment in 1993, if invested in 1983 with no interest or other return payable for ten years, would provide useable funds (in 1983) of only $385 million, assuming 10% annual cost of money.
- If the funds are invested in 1988, the net amount thus available (again assuming no interest or other return payments until 1993) would be $620 million.
- Alternatively, if the funds are invested in four equal annual amounts, from 1986 to 1989 inclusive, such investments would amount to $150 million a year for a total of $600 million.

Given the range of possible investment values arising from varying revenue streams, tax considerations and present value discounting, a carefully worked-out plan will be required to thread one's way through the array of opportunities and obstacles confronting the Project financing. The Task Force stands ready to assist in developing acceptable arrangements for capitalizing on the future market value of the CRBR Project in order to obtain significant financial support for the Project.

VI. Suggested Plans to Capitalize on the the Value of the Project

The future market value of the CRBR Project can be capitalized on, if, and only if, the licensing, completion and operating risks are eliminated through prompt Federal action. Also, appropriate fuel supply assurances must be provided and private investors assured that future revenues will be adequate to earn an appropriate return on, and return of, their investment.

As indicated in the foregoing Sections, several approaches seem feasible:

(1) Straight-forward borrowing based upon future power supply contracts.

- The DOE might contract to purchase the entire CRBR output for use in its uranium enrichment plants, with annual payments sufficient (net of operating costs) in any event to pay the debt service. That contract could then be pledged as security for a long-term loan.
- Alternatively, the DOE might warrant that the CRBR will produce a minimum amount of power and provide price supports such as those proposed for synthetic oil in the mid-1970s when the Government offered to provide such oil at a support price for resale to user utilities. There is ample precedent for price support in Public Law 96-294, the Energy Security Act. Such price supports should be adequate to cover all debt service requirements.

(2) Sale of Partnership equity interests and debt securities of an entity which would purchase and own the entire CRBR Project.

- To be marketable, such Partnership equity interests would require broad Federal assurances as to the deliverability of a reliable and acceptable facility.
- Long-term power sales contracts (like those described under (1)) would also be required.

- In order to realize the full extent of available tax benefits, favorable IRS rulings would be essential.

(3) Sale of Partnership equity interests and debt securities of an entity which would purchase and own only the BOP.

- This approach would require all those items discussed under item (2) except that BOP operating risks might be assumed by the owners.
- In addition, an acceptable steam supply contract would be required because, without such a contract, commercial viability cannot be assured.
- With appropriate contractual provisions, this approach may be the best way to maximize the tax benefits associated with the Project.

Conclusion. Under any of the foregoing plans, it would be feasible to work out arrangements so that payments received for the future value of the Project or the BOP would be adequate to provide significant investment support.

VII. Other Approaches to Funding Capital Requirements

The only other way to obtain significant additional capital funds from private investors would be to provide other assets or potential benefits adequate to assure that the investor will get something of value in return and be compensated for risk.

Potential "assets" not already discussed fall into six categories:

(1) Assurances that private investors will recover their investment and the cost thereof if timely Federal appropriations are not provided, and that annual appropriations will be continued if the Project is delayed.

- Such a commitment would assure investors that the Federal Government intends to see the Project through to completion despite past uncertainties.

- It would also facilitate interim financing during periods of peak construction expenditures.

(2) Additional tax incentives, similar to those associated with any large capital-intensive R & D project.

- Such tax incentives would not be a wind-fall for investors; instead, they would be designed to provide additional "value" which the Project can offer in exchange for funds invested. For full discussion, see the appendix prepared for the Task Force by tax counsel.

(3) Other source of funds.

- Possibilities include additional warranties by manufacturer/vendors and architect/engineers and additional R&D commitments from manufacturer/vendors and architect/engineers, or the domestic electric utility industry. Local regulation and the controversial nature of the CRBR Project would make it very difficult to raise such funds from either the regulated electric utility industry or the Electric Power Research Institute. Any attempt to do so might well jeopardize existing CRBR funding arrangements.

(4) Additional foreign R & D commitments.

(5) Licensing revenues, based upon potential patent rights.

- Action would be needed to protect breeder R & D from reaching the public domain and make potential worldwide licensing revenues available to support CRBR Project financing.*

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* Care would have to be taken to assure that such action did not diminish the patent rights of the BRC members under their Utility Contribution Agreements, which could jeopardize collections from such members.

(6) Direct Federal assurances.

- If other financial mechanisms are inadequate, the alternative may be for the Federal Government to act as a "deep pocket" guarantor of Project debt, lease obligations and equity returns.

****

The foregoing Sections outline an array of financing alternatives which are available to the CRBR Project. While the Task Force prefers no single financing approach, the following Sections describe in broad terms one possible financing program which seems promising.

VIII. Possible Financing Entity

- The CRBR Project is faced with the need for significant funds; and without specific legislation, it would be unable to obtain such funds.
- Such legislation may be needed to provide necessary warranties and tax incentives. It is also needed to create a financing entity which can use those warranties and incentives.
- That entity can take several forms but, in any event, it should be designed to bring the Federal Government and a group of private investors together in a single enterprise so as to enable completion (through combined Federal/private financing) of an important R & D facility on which more than $1.5 billion has already been spent and which it would be foolhardy to junk.
- Accordingly, the following format is suggested as a basis for further study and review:
  - (a) Its name: whatever it is finally named, it is hereinafter referred to as the "Partnership."
  - (b) The form: A public/private joint venture, created by Federal statute, encompassing both Government and private investment capital.

(c) Partners would include a newly created Federal corporation (or the DOE) as general partner and a group of private investors as limited partners.

(d) The limited partners might be individuals, corporations, or partnerships, depending on tax and regulatory considerations.

(e) The Partnership would be entitled to receive and allocate tax benefits among its partners.

(f) Ownership of the Project should be vested in the Partnership. Care should be taken not to disturb present licensing arrangements, but the Partnership should be provided with enough of the characteristics of ownership so that tax deductions and credits can be allocated among the limited partners.

(g) TVA would operate the Project and wheel power produced pursuant to a keep-whole reimbursement contract.

(h) At the conclusion of operations and recovery by private investors of their investment, title would revert to the Federal Government. Provision should also be made for decommissioning and waste disposal responsibility to remain in the Federal Government.

IX. Powers of the Partnership

The Partnership should have the following powers, among others:

- To issue its own debt obligations with Federal warranties, which could include borrowings from the Federal Financing Bank (FFB),* and/or without Federal warranties.
- To issue limited Partnership equity interests and to allocate tax benefits among the limited partners;

---

* Alternatively, the Partnership could have the right to sell notes to the U.S. Treasury and Treasury would be obligated to purchase such notes.

- o To pledge the proceeds from its contracts and agreements as security for its debt, lease, joint venture or partnership obligations;
- o To ratify and assume obligations under existing contracts and to enter into new purchase, construction and operating agreements, to buy and sell power, to sell and lease back facilities and fuel, etc.;
- o To obtain and hold title to patents and to license the use of such patents worldwide;
- o To enter into appropriate joint ventures related to the CRBR Project;
- o To be exempt from the Public Utility Holding Company Act and the Federal Power Act and not to be considered a regulated public utility for any purpose, state or Federal.

X. Priority Assessment of Actions Needed

In addition to the legislative action needed to create the Partnership with the powers set forth in Section IX, it must be given enough financial substance to allow it to function. Actions required to provide that financial substance have already been described. They are listed below, with only moderate additional amplification, because the listing is intended primarily to indicate their relative priority.

(1) Assurances must be provided as to completion, licensability and operability.

- o Such assurances must be unconditional if the required funds are to be obtained, especially in view of the uncertainties surrounding the outstanding WPPSS obligations.
- o In the event the Project is not completed, licensed and placed in operation, private investors would be entitled to recover the capital they had provided plus a return thereon.

(2) Assurances must be provided as to the amount of power the Project will produce.

(3) Power purchase contracts must be provided for the Project's full output at an assured price.

- Such contracts may represent either direct Federal power purchases or third-party purchases backed by Federal assurances.

- As mentioned earlier, such assurances with regard to power purchases and the price thereof have statutory precedent in the Energy Security Act where, as here, the need for future secure energy justifies such support.

(4) Provide a Bankable Commitment that adequate Federal funds (at least $1.4 billion) will be appropriated after FY 1983, or, if not, that private investors would be entitled to recover the capital they had provided plus a return thereon.

- The commitment should apply to the period from FY 1984 through FY 1990.

- It should provide for additional appropriations thereafter until the Project is licensed and achieves a commercial level of reliable operation.

- It should be sufficiently firm to be Bankable.

- Although the Congress does not normally appropriate funds for more than a year at a time, it should empower the DOE (i) to enter into the sort of commitment described above and (ii) to borrow from the FFB or from the U.S. Treasury the funds necessary to meet such commitments.

(5) Assure that project-related tax incentives can be allocated among the limited partners, as is customary for all large construction partnerships.

- These tax incentives, which are generally available to the owners of any large construction project, include investment tax credits, accelerated depreciation and the immediate deductibility of certain overhead and operating expenses.

- It is customary to allocate such project-related incentives among the partners.
- Consequently, the allocation of these incentives among the Project partners would in no way provide a wind-fall for investors.
- All expenditures in excess of the Project's market value might be treated as R & D expenditures deductible by the limited partners. This was the formula used in 1955 to aid in financing Dresden Unit Number One (the first privately financed U.S. nuclear power reactor), whereby all expenditures by the Nuclear Power Group (a financing consortium) in excess of the commercial value of the plant were allowed as immediate tax deductions.
- In case the foregoing conventional tax incentives prove inadequate to provide the capital required, a number of new approaches might be considered. For example:
  - A special energy tax credit might be provided, applicable solely to the Project.
  - The Partnership might be empowered to enter into arrangements with the City of Oak Ridge to issue tax-exempt industrial development bonds backed by the Partnership and without regard to the so-called two-county rule.

For further discussion of the matter of tax incentives, see the appendix.

CONCLUSION

The Task Force concludes that the Clinch River Project can support significant private investment, and that the present Government/private business relationship can be enhanced, to the benefit of the entire nation.

From the viewpoint of the Federal Government, the benefit of obtaining private CRBR financing would be a near-term reduction in Federal budget requirements and increased private participation in the Project. Clearly, Federal assurances, warranties, and tax incentives will be needed in order to attract private financing. However, many of the proposed assurances are contingent and would not be called upon unless the Project failed to perform as expected, or the Government failed to complete the Project on schedule or the power revenues were substantially less than projected. Moreover, the Task Force assumes that the financing arrangements will reserve to the Federal Government the residual value of Project assets.

The Task Force stands ready to assist in determining how best to proceed.

Respectfully submitted,

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March 12, 1983

Tax Incentives

Taxes and tax incentives are significant elements in capital costs. The cost of financing is increased to the extent that the investor must pay tax on his investment return, while combinations of tax incentives can both lessen the burden of taxes on the investor's return and, in addition, provide a positive cash flow (thus producing, through the tax system, a stimulus to desired expenditures).

Predictably, such combinations of incentives are popular with the tax-paying public and unpopular with the Treasury Department. They tend also to be popular with Congress because they enable it to encourage research and modernization expenditures without directly appropriating federal funds.

Existing tax incentives for investment come primarily in three forms:

(1) Deductions: the right to deduct costs against income. This is, of course, not a special incentive unless and to the extent that (i) the costs deducted exceed the costs actually incurred, (ii) the costs are deductible in advance of the period in which they are economically incurred, in which case there is an acceleration of tax reduction, which is equivalent to an interest-free loan for the period of acceleration, or (iii) the costs are, in effect, attributable not to the stream of income against which they are de-

ducted, but to another stream of income which is exempt from tax.

R & D deductions. Of special importance to this project would be an R & D deduction equivalent to that portion of total project expenditures represented by the estimated excess of such expenditures over the commercial value of the completed facilities as measured by the cost of conventional facilities of the same character.

(2) Tax credits, such as the investment tax credit and the energy tax credit, which reduce the taxpayer's final tax liability. The investment tax credit, for example, will reduce tax liability $10 for each $100 of qualified investment, and the energy tax credit, if applicable, will reduce tax liability by an additional amount ranging from $10 to $15 under existing law (depending on the type of energy property involved). Prior to this year, those credits did not reduce the amount of taxpayer cost which could be depreciated. Thus, if a taxpayer paid $100 for an asset eligible for $20 of ITC and energy credit, the credits were immediately available and the taxpayer's real cost was effectively $80. Nonetheless, the taxpayer was permitted to depreciate the entire $100. Thus, the value of the two credits consisted of two elements: (i) $20 plus (ii) the right to depreciate $20 which was not in reality an economic cost. The value of that second element depended upon the period over which the depreciation was allowable, but for assets of medium life, a

$20 credit could produce a reduction of more than that in the cost of capital. The 1982 Tax Act modified this result by providing a reduction in the depreciation base equal to 50% of the amount of the credit (with some optional treatments not here important). In sum, to the extent that credits do not produce a basis adjustment, the value of the credit is larger than the credit percentage indicates.

(3) Exemption of investment income. The income produced by a particular investment may be categorically exempted from tax. In order to understand the interaction of this exemption incentive with other incentives, it is important to think of an investment as economists do (and not as accountants and lawyers do), i.e., as an expenditure which produces a stream of gross income which is then divided among two classes of claimants, creditors and equity owners.

The device widely used to exempt a portion of the income stream is the Industrial Development Bond (IDB), which exempts from tax that portion of the income from the investment which flows to creditors holding such bonds.

Optimum Combination of Incentives

An optimum combination of incentives would maximize in a single transaction all of the above three elements. If, for example, 90%

of a project could be financed with IDB's and the deductions and credits attributable to the entire cost of the project could be preserved for use by the equity owners, the total available tax benefits would be substantial and might produce tax deductions and credits to the equity owner in excess of his tax burdens. If the aim were to minimize total financing costs, it would be important (in that event) to reduce the amount of debt and increase the amount of equity to a point where the tax benefits produced exactly the desired level of cash flow, thus providing the minimum required equity return.

The Treasury Department is understandably critical of such tax planning and has for some years been chipping away at the rules in order to prevent it. As a result, today's applicable rules are a complex network of provisions, limitations, exceptions, cross-exceptions, etc., which can be satisfactorily described only in the context of specific proposals.

For present purposes, it may be sufficient to observe that broad general concepts are in place which could permit an optimum combination, and that one-shot modifications in existing limitations and exceptions would be achievable through legislation if there were a Congressional desire to make the overall project work.

Such legislative amendments would not need to be included in the Internal Revenue Code; but they would almost certainly require approval by the Congressional tax-writing committees, as distinguished from the committees having jurisdiction over energy, appropriations, etc.

Equity Ownership

Tax incentives which come in the form of deductions and credits can be fully utilized only by entities which have sufficient taxable income from other sources to absorb those deductions and credits. The level of incentives provided by present depreciation and ITC rules alone is sufficient that, even in an average situation, the taxable income flowing to the equity owners of a new project may not be sufficient fully to absorb the available deductions and credits. The problem is exacerbated if additional credits (such as the energy credit) are available or if there is a significant degree of financing available from other sources.

Thus, if the deduction and credit incentives are to be fully utilized, it becomes necessary to have some legal mechanism to permit them to be flowed through to others (normally equity owners) who can utilize such benefits. (Deductions and credits do not, of course, flow through to ordinary stockholders, so that an equity financing in the form of a conventional public issuance of stock will not achieve the desired result.) Two "flow-through" structures are typically used: (i) a partnership which owns and operates the project, or (ii) a partnership which leases the project to an operator. There is ample precedent for widely syndicated participation in owner-operator partnerships and, to a lesser degree (because of limitations on ITC in the hands of individual lessors), in lease partnerships. Where wide distribution is desired, it is normally necessary to limit the potential liabilities of individual investors by using a "limited partnership".

In the case of both operating and lease partnerships, if partnership debt is nonrecourse, the so-called "at risk" provisions in existing tax rules generally prevent the full flow-through of depreciation and (subject to certain exceptions) credits where the partners are individuals or closely held corporations. Thus, unless a special exception were made, it would be desirable to confine the equity participation to widely held corporate investors. Even then, if such investors were limited partners, the flow through would not work under existing rules unless the indebtedness were nonrecourse. That makes it absolutely essential that either the indebtedness be backed by an assured and ample cash flow or some legislative exception to the "at risk" rules be obtained.*

A further problem is that individual or corporate partners in a project which constitutes a regulated public utility may themselves be (or fear they may be) subject to public utility rules.

---

* One possibility would be a mechanism to allow tax benefits associated with this single project, on a one-shot basis, to be transferable to any investor providing significant new capital therefor.

Thus, if the partnership were structured as an operating entity, it may be practical to sell equity participation only to other public utilities. In order to avoid such difficulties, the equity investors might assume the status of owner-lessors, who in turn were to lease to some operating entity. This would normally avoid the regulated public utility problems, but would entail either compliance with or modification of another complicated set of tax rules relating to lessors, all of which are to some extent in flux at this time, but which could almost certainly be temporarily held in abeyance through special legislation.

Debt Financing

Present rules permit the issuance of IDB's for electrical generation only in the case of the "local furnishing" of electricity. This has been interpreted to mean distribution solely within a territory no larger than two counties. The "two-county" rule is a peculiar rule with a peculiar history. Some modifications of it might be possible, on a one-shot basis, but any general relaxation of the rule would open the way for massive tax-exempt financing of electrical generation, which is a frightening spectre to both Congress and the Administration. Unless such fears can somehow be put to rest, the use of IDB's will be difficult to achieve.

Exempt financing would, of course, be available if equity ownership of the facility were in a state or local government entity

But in that case, the positive cash flow benefits of deductions and the investment credit would be unavailable.

It is possible for Congress to authorize the issuance of tax-exempt debt by a new, specially defined not-for-profit corporation which would fit this case. While such an authorization would be plowing new ground, it should not be rejected out of hand.

Miscellaneous Observations

The present energy tax credit has limited applicability and is, in any event, scheduled to expire. Some kind of legislative action would, therefore, clearly be required in order to make that credit or something comparable to it available to the project in question.

If some way could be found to issue tax-exempt debt, the general rules applicable to tax-exempt financing would permit a limited amount of investment of the proceeds in taxable securities pending construction and to some extent after construction. This potential is governed by the so-called "arbitrage rules", which are also complex. These, too, could be relaxed for a special case if Congress desired to do so.

Conclusion

Under optimum circumstances, the tax benefits potentially available could provide significant additional funds for this project. Such benefits could be provided without having to create basic new concepts or provisions, but coming close to the optimum combination described would almost surely involve some legislative enactments which would require very careful structuring.

No tax windfall. It is important to note that all of the tax incentive structures described have the effect of reducing the cost of the capital investment and do not have the effect of providing anything other than normal returns to private investors. The net result is that the private investors will have a cash flow that returns their investment, together with a reasonable market rate return---no more, no less. The source of their cash---the fact that it comes in the form of tax benefits---is of no consequence to them; they are interested only in dollars. It is immaterial to them who transmits the dollars. Thus, any contribution in the form of tax incentives will flow, in economic effect, not to the investors, but to the project, itself, with any excess being ultimately returned to the federal government through the operation of federal/private financing arrangements already in place.

BREEDER REACTOR CORPORATION
P.O. BOX 767, CHICAGO, ILLINOIS 60690

June 29, 1983

Mr. Wallace B. Behnke
Chairman
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Post Office Box 767
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Honorable Donald Paul Hodel
The Secretary of Energy
Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D. C. 20585

Gentlemen:

I am pleased to forward to you a Second Report of the Breeder Reactor Corporation Task Force which was assembled to explore alternative financing possibilities to supplement future Federal appropriations supporting the construction and operation of the Clinch River Breeder Reactor. The enclosed Report provides a detailed financing plan which the Task Force, including representatives from a number of utilities and investment banking firms, believes provides a viable basis for private sector supplemental financing.

The members of the Task Force and BRC stand ready to provide further information or to assist in the implementation of the proposed financing plan, as required.

Sincerely,

James J. O'Connor
Chairman

Enclosure

cc: BRC Board of Directors

FINANCING THE CLINCH RIVER BREEDER REACTOR PROJECT

A Task Force Report to the Breeder Reactor
Corporation Supplementing its March 12,
1983 Report on Alternative Financing
Possibilities for the CRBR Project.

June 23, 1983

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Appendix: Federal Assurances Required

HIGHLIGHTS

- We have developed, and present herein, a specific plan for raising one billion dollars of private capital for the CRBR Project.

- One billion dollars represents 40% of the estimated remaining cost to complete the Project. It represents the maximum amount of available private funds and is roughly equivalent to the entire cost of constructing a conventional coal-fired plant of approximately the same size in the 1990's.

- With appropriate legislation, we are confident that one billion dollars of private financing can be obtained.

- Four leading investment banking firms (all represented on our task force) have endorsed the plan, providing a statement that, with adequate Federal assurances, significant private funding can be obtained for the Project.

- We are implementing our financing plan to the maximum extent possible in advance of specific legislation by incorporating the American Energy Development Corporation, a financing vehicle, preparing organizational and financing documents, and recruiting executive personnel.

- Two-thirds of the private funds available for the Project will be raised through borrowings supported by revenues from future power sales; one-third will be raised through new equity participations plus funds already committed by the utility industry and others. All new investments would be backed by DOE contracts.

- Potential lenders will be institutions such as banks, insurance companies, pension funds and other financial institutions. Most of these institutions are fiduciaries which are held to strict accountability, frequently restricted in their discretion by statute or regulation and generally averse to high risk investments.

- Hence the need for Federal assurances covering completion, licensing, operability and revenue adequacy, as described in the Appendix.
- We have received letters from vendors and contractors expressing interest in investing in the Project.
- Income attributable to private investment in the Project will be subject to Federal income tax. In computing the tax, conventional construction-related tax incentives will be available, but only to the extent available in other comparable private projects. No such incentives will be available with respect to any expenditures which are covered by Federal appropriations.
- In general such incentives will reduce, but not eliminate, the total tax burden on investment income from the Project.
- Non-tax aspects of the proposed financing arrangements will result in a significant potential gain to the U.S. Treasury.
- After the Project has been completed and operated successfully for several years, it may be feasible, with the Government's permission, for the new American Energy Development Corporation to sell common shares and use the proceeds to purchase the CRBR facilities from the Government.
- Since our financing plan will significantly reduce total Federal budgetary outlays at a time when budget requirements are of critical importance, and holds the prospect of net future gain to the Treasury, it is clearly responsive to the 1982 Congressional mandate.
- Having taken preliminary steps toward putting our plan in effect, prompt enactment of appropriate legislation is now needed to enable us to raise the one billion dollars.

FINANCING ILLUSTRATION

Sources of the one billion dollars of privately financed construction funds are estimated as follows:

	Millions
Proceeds of 30-year bonds issued in 1990	$1,040
Deduct interest during construction	365
Direct construction funds provided by borrowings	$ 675
New equity participations	150
Funds already committed by utilities and others, including interest (in addition to about $150 million already paid in)	175
	$1,000

For details, see Section II-G.

FINANCING THE CLINCH RIVER BREEDER REACTOR PROJECT

A Supplemental Task Force Report to the Breeder Reactor Corporation

EXECUTIVE SUMMARY

(1) A viable $1 billion plan. This supplemental report describes a specific plan for raising one billion dollars of private funds (the maximum available) to cover 40% of the estimated remaining costs to complete the Clinch River Breeder Reactor (CRBR) Project.

(2) Equivalent coal-fired capacity cost. The proposed private funding of one billion dollars is roughly equivalent to the entire cost of constructing a conventional coal-fired plant of approximately the same size, 300 to 400 MWe, in the 1990's.

(3) Reduced Federal deficits. These funds would be provided to the Federal government under a Joint Venture arrangement and would reduce the Federal budget deficit at a time when budgetary expenditures are of widespread concern.

(4) Investment banker endorsement. Four leading investment banking firms are represented on our task force. Their representatives have participated actively in our work and have helped develop our financing plan. Their firms have given us a signed statement saying, among other things, ". . . in the event [appropriate] legislation is enacted and the Secretary of Energy provides adequate assurances as to the timely return of invested capital with interest thereon, we believe that significant private funding can be raised for the CRBR Project." The four firms signing that statement were:

Lehman Brothers Kuhn Loeb Incorporated
Merrill Lynch White Weld Capital Markets Group
Morgan Stanley & Co. Incorporated
Salomon Brothers Inc

(5) Need for Power. We have received letters from several large electric power systems (both investor-owned and rural electric cooperatives) indicating an interest in purchasing CRBR power. Studies made by the United States Department of Energy (DOE), supported by information received from the Southeastern Electric Reliability Council, show a need for power in the southeast in the early 1990's.

(6) Implementation. We are proceeding to take preliminary steps to implement our financing plan. We are incorporating the American Energy Development Corporation, a financing vehicle, and will soon select a Chief Executive Officer and Board of Directors. We are preparing organizational and financing documents.

(7) Two-thirds debt, one-third equity. Approximately two-thirds of the one billion dollars of private funds will be raised by interim construction borrowings in the capital markets, with the permanent financing provided by selling taxable bonds supported by revenues from power sales. The remaining one-third of the private funds will be raised through new equity participations, plus funds already committed by the utility industry and others. All new investments would be backed by DOE contracts.

(8) Institutional lenders. Potential lenders are largely institutions such as banks, insurance companies, pension funds, and other financial institutions. Most of these are fiduciaries which are held to strict accountability, frequently restricted in their discretion by statute or regulation, and generally averse to high risk investments. While they seek to maximize return, their first concern is preservation of principal. Their fiduciary responsibility prevents them from making an investment where repayment of principal and payment of interest is in substantial doubt.

These lenders will bear normal capital market risks, but in order to invest in the CRBR Project they will require Federal assurances covering completion, licensing, operability and revenue adequacy. This is particularly understandable in view of the Project's long history of political indecision and controversy which, together with other significant uncertainties about investments in public power projects, comprise unique project risks (as distinguished from capital market risks) for which the Federal government must continue to bear the responsibilities that it already carries. The nature of these assurances is set forth in the Appendix.

(9) Equity investors. Potential equity investors will require some participation in conventional Project-related tax benefits. On the other hand, all income attributable to private investment in the Project -- both interest and equity return -- will be subject to Federal income tax. In computing the Federal tax levied on private investment in the Project, only conventional construction-related tax incentives will be available, and only to the extent available in other comparable private projects. No such incentives will be available with respect to any expenditures which are funded by Federal appropriations.

(10) Tax Effect. Tax incentives reduce, but do not eliminate, the tax burden for taxpayers generally, and will do so here, too, to an extent no greater and no less than for taxpayers generally. Hence, there will be no net loss to the United States. This point is discussed in Section II-K.

(11) Long run effect on the U.S. Treasury. Over the life of the Project, there is likely to be a significant net gain to the Treasury, for a variety of non-tax reasons, including the system of incentives provided by our financing plan, viz.--

- Construction costs. The advanced status of design, procurement, and preconstruction planning, and the existence of a strong project-wide schedule and cost control system, will minimize those construction delays and construction costs which are within the control of the equipment suppliers and construction contractors.

  Adoption of our financing plan, coupled with a multi-year appropriation of Federal funds sufficient to complete the Project, will go one step further and ensure against many delays which are beyond the control of suppliers and erectors -- e.g., delays from lack of funding and other Government action -- thus, enabling the schedule and cost controls which are already in place to be fully implemented.

- Future operations. Once the Project has been placed in service, the financing obligations contemplated by our plan will provide strong incentives to operate the Project in such a way that the debt service and other financial requirements will be met consistently. Project managers will be encouraged to improve commercial operations so as to avoid jeopardizing net revenues and, thus, being put on the spot for triggering the DOE's obligations to investors. This will enhance the possibility of providing significant residual values for the Treasury.

(12) Potential Gain.

These benefits should far outweigh the nominal interest advantage which federal financing enjoys *vis-a-vis* private financing. In the long run, therefore, the task force plan has the potential of saving the United States Treasury a great deal of money.

(13) Other items.

- The CRBR Project is an experimental research and development project, an essential step in the Government's Liquid Metal Fast Breeder Reactor program, a long-range program to achieve a high degree of national energy independence in an environmentally acceptable way with minimal reliance on fossil fuel resources. The Federal government has the responsibility for and control of developing that technology and carrying through on the construction and completion of the CRBR Project.
- Termination of the CRBR Project would be extremely costly, including not only the direct costs of over $300 million (estimated by DOE) for site restoration, termination of employees, cancellation of contracts and damages, but also the indirect costs to our national economy of taking one more step backward from the nuclear export markets which the United States once dominated.
- We have received letters of interest from vendors and contractors expressing interest in investing in the Project.

- Given the poor financial position of the U.S. electric power industry and the current rate regulatory climate, there is little likelihood that substantial additional R&D funds can be obtained from the nation's electric utility companies. However, these utilities and others, which will have paid about $150 million towards the cost of the Project by the end of Fiscal Year 1983, stand ready to pay about $175 million more, including interest, in accordance with prior commitments, as the Project goes forward.

- After the Project has been completed and operated on a commercial basis for several years, additional risks may be assumed by private investors. For example, the newly-formed American Energy Development Corporation referred to earlier could, in the future, provide a mechanism for ultimately selling common shares and using the proceeds to purchase the facilities from DOE, if that were the Government's wish.

(14) Conclusion. The CRBR Project is well advanced in design, component procurement, site preparation, pre-construction planning, and licensing. We have identified and describe here a viable financing plan which will provide one billion dollars of private funds. Since our plan will significantly reduce total Federal budgetary outlays at a time when budget requirements are of critical importance and holds the prospect of net future gain to the Treasury, it is clearly responsive to the 1982 Congressional mandate ". . . to explore proposals . . . that would reduce Federal budget requirements for the Clinch River Project or project alternative, and secure greater participation from the private sector." (H.R. Rep. No. 97-980 at 186, 97th Cong., 2d Sess., 12/20/82.)

We are implementing the plan, to the maximum extent feasible pending enactment of appropriate legislation, and we therefore urge prompt action on such legislation.

I. GENERAL BACKGROUND

On March 12, 1983, a task force assembled by the Breeder Reactor Corporation submitted its report on alternative possibilities for obtaining additional private sector financing for the CRBR Project to the United States Secretary of Energy, who transmitted it to the Congress on March 15, 1983. Comments made since then, in Congress and elsewhere, suggest the need for additional explanatory material.

This supplemental report provides such material. It describes the task force plan for private financing of one billion dollars of the remaining funds estimated to be needed to complete the CRBR Project, equivalent to about 40% of such remaining funds. It explains how that plan will complement the Federal government's role. It sets forth the assurances needed to facilitate raising the one billion dollars of private funds and explains the steps being taken to facilitate raising these funds as soon as those assurances are enacted into law.

A. Federal Sponsorship

The Federal government must formulate its energy program from a long-term rather than a short-term perspective, because it is to the Federal government that the public will look to protect the interests of future generations. A cornerstone of federal energy policy through many Administrations has been the development of inexhaustible energy sources.

Nuclear technology, especially breeder technology, is the most likely source of future supplies of plentiful and low-cost electricity when fossil fuels become relatively scarce and expensive. It is not too soon to carry forward breeder technology to the demonstration stage. The completed design, licensing and, most importantly, extended operation of the CRBR Project over a long period, will be invaluable, first, as a basis for the design and operation of a larger prototype and, ultimately, for a decision whether or not to build and deploy commercial breeders. If the nation is to develop the information necessary to make commercial decisions on a timely basis early in the next century, the CRBR Project, the first full-scale demonstration plant, must be built now.

B. Historical Summary

It was the Federal government's recognition of its responsibility for assuring adequate and economical future energy supplies, including the technological capability to build breeder reactors, that convinced Government leaders to proceed with the CRBR Project as the logical next step in the Liquid Metal Fast Breeder Reactor Program. Early on, the Federal government took the initiative in soliciting industry participation in funding the CRBR Project as an important step towards making this technology available to the private sector. The arrangements for Government support and industry participation were negotiated by the United States with representatives of all segments of the electric power industry. The nation's electric power systems committed to make large financial contributions and they created Breeder Reactor Corporation and Project Management Corporation, in reliance on the Government's commitment to complete the CRBR Project. It would be unfortunate, both for the future of national energy security and for the future of government/industry cooperation in other areas, if the United States were now to retreat from its undertakings, after the utilities and others in good faith have spent $150 million on the CRBR Project and will provide an additional $175 million as the program goes forward. It is disappointing to see to what small extent current debates about funding the CRBR recognize the obligations the United States has already assumed and the expenditures it has induced others to make.

The current funding discussion provides a test of the resolve of the Government in living up to its promises. The United States created the financing and construction arrangements and enlisted the construction, operation and financial assistance of the electric utility industry. The coalition of utility companies has held together and is anxious to go forward to complete the CRBR Project, although it has no financial incentive, but only a desire to advance breeder technology for the ultimate good of the nation. The partnership arrangements between the United States and the participating electric utilities should not be abandoned by unilateral action of the Government.

C. Need for CRBR Project

Many voices have spoken on the question of the need for the CRBR Project, from various perspectives and with the benefit of more or less study and information. Last September, Alvin M. Weinberg, Director, Institute for Energy Analysis, Oak Ridge Associated Universities, a pioneer nuclear scientist, summarized the case for the CRBR Project in these terms, after a visit to the French Phenix and Super Phenix breeder reactor demonstration projects:

> Rather than dismantling our breeder technology, we should be consolidating the technology demonstrated by PHENIX and SUPER-PHENIX. Forty years pass quickly. If we are to depend on breeders for a serious contribution to our energy supply in 2022, we should even now be building, operating, and learning from many breeder reactors in different settings and in different parts of the world. This is why we should proceed with CRBR, as well as with other, even more advanced breeders.*

It should be added that the CRBR Project embodies state-of-the-art technology. The design team has taken advantage of all available information, including the lessons learned from the Brown's Ferry and Three Mile Island accidents. Proposals for substituting another project at a later date would not result in a better project. On the contrary, to abandon the CRBR Project at this time would dismantle not only the Project, but the nation's industrial capability to proceed with any breeder reactor demonstration program.

D. Cancellation Consequences

The March 12 report of the task force discussed the costs of completion, but did not take into account the costs, both financial and otherwise, of failure of completion. These cancellation costs--for equipment on order, for the cost of terminating employees, and for settlement of contracts for services and otherwise--are estimated by

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* Plant Energy Management, September 1982.

DOE at over $300 million. An orderly termination which would salvage as much technical information as possible could increase this amount significantly. Moreover, in a period of high unemployment, some consideration should also be given to the indirect costs of noncompletion, including the costs of increased unemployment and unemployment compensation. Finally, the cost to our national economy of the technological retreat inherent in abandoning the CRBR Project after spending a billion and a half dollars on it must be considered, especially when work is proceeding smoothly. To ignore these costs would be to take another long step toward ensuring the loss of our nuclear export markets, which we once dominated.

All of these costs of noncompletion, direct and indirect, should be considered as credits against the cost to complete the Project.

E. Task Force Proposal

Fundamentally, the task force proposal is based upon the assumption that this country cannot afford to fall behind the development of breeder technology overseas, which would result if the CRBR Project were cancelled. It is also based on the fact that no private interest is in a position to take up the financial burden of completing the Project. The proposal is therefore framed in terms of specific ways that private industry can cooperate with the United States to reduce the short-term burden on the Treasury and to make an overall contribution to long-term funding.

The task force realizes that the Government has many other claims on its resources. Many of them, however, do not plant the seeds of future growth and technological leadership. In contrast, the CRBR Project holds out the prospect of a better future for all Americans.

Other countries have long recognized the need to develop breeder technology. Great Britain, France, and Russia already have breeder reactors installed in working power plants and are using them to generate significant quantities of electricity. Japan and Germany have their own breeder projects underway. The United States cannot afford to lag behind.

II. DESCRIPTION OF THE RECOMMENDED FINANCING PLAN

A. Joint Venture

It is proposed that the entire CRBR Project, both the nuclear steam supply system and the balance-of-plant, be treated as a single entity organized as the CRBR Joint Venture, a joint venture between the Federal government and a partnership of private investors (the "Partnership").

The Government and the Partnership would each be participants in the Project, in proportion to their respective investments. Existing construction, licensing and operating responsibilities would not be changed.

B. Partnership.

The Partnership would provide the Joint Venture with funds raised in the capital markets, derived from both interim construction borrowings and the sale of long-term debt and equity securities, all backed by DOE contracts. It would also attempt to obtain funds from new sources--R&D contributions, vendor participations and foreign participations.

The Partnership, acting on behalf of the Joint Venture, would sell the Project's entire electric power output. Revenues from the sale would ultimately be pledged as security for long-term taxable bonds. Payment of interest and principal thereon would be made from such revenues, after deducting fuel and other expenses. Such payment would be protected, in the event of shortfalls, by DOE contract.

The Partnership would issue equity participations to the partners supported by tax incentives and, to a lesser degree, by such shares in excess power sales revenues and in the residual value of the Project as may be established by contract with the United States Department of Energy ("DOE"). The partners would be entitled only to those conventional investment tax credits and tax deductions for depreciation, R&D, and other costs which are normally provided to the owners of comparable private projects, but only to those credits and deductions which are attributable to Project expenditures paid for with private funds. The partners would be indemnified by DOE against the possible loss of such tax benefits.

C. Construction Financing

To facilitate financing flexibility and provide construction funds when needed to optimize construction scheduling, interim construction financing commitments would be obtained from institutional lenders, subject to refunding with proceeds from the sale of long-term bonds upon completion of the Project.

D. Partnership Responsibilities

The Partnership would enter into contracts with the DOE under which the Partnership would provide construction funds, dispose of the electric power output of the Project, pay for fuel, other expenses, debt service charges and other obligations to private investors. It would apportion excess revenues, tax incentives and residual values as provided by contract. It would also arrange for interim or supplemental borrowings, if required, and would take other appropriate actions to facilitate completion and operation of the Project and ensure its viability.

E. Formation of a New Corporation

In order to facilitate the various financing, marketing and organizational steps required and help to carry out the responsibilities of the Partnership, a new privately-financed business corporation is being incorporated, the American Energy Development Corporation ("the Company"). Election of a Chief Executive Officer and a Board of Directors will occur soon.

It is expected that the Company will act on behalf of the Partnership in carrying out the activities referred to above, including development of financing arrangements, filing registration statements and requests for tax rulings, negotiating power supply contracts, and disposing of revenues therefrom.

F. Efficiency Incentives

By its very nature, the financing plan will reduce construction costs, increase power sales and maximize operating efficiency, as described below.

Construction costs. The advanced status of design, procurement, and preconstruction planning, and a strong project-wide schedule and cost control system will facilitate efficient fabrication, delivery and construction, and minimize those construction delays and expenditures which are within the control of the equipment suppliers and construction contractors. The fact that all long-lead-time equipment has already been delivered or is well advanced in fabrication lends assurance to the construction schedule and cost estimates. Adoption of the financing plan, coupled with a multi-year appropriation of the Federal funds needed to complete the Project, will go one step further and eliminate many delays which are beyond the control of suppliers and constructors, e.g. delays due to lack of funding or unexpected Government action--thus enabling those schedule and cost controls which are already in place to be fully implemented.

Future operations. Once the Project has been placed in service, the very existence of significant debt and equity obligations to be paid from net revenues will provide Project managers with a strong incentive to maximize power sales and operate the Project in such a way that the obligations to investors will be met. To put it bluntly, under the financing plan, all departments and agencies will be discouraged from taking any action which could reduce output, jeopardize revenues, or unnecessarily raise operating expenses, because if net revenues available after paying for fuel and other expenses are insufficient to cover obligations to private investors in the Project, the Federal government will have to provide money for such purposes pursuant to the assurances it made to induce such investments, and management will be put on the spot to justify its actions.

Additional incentives. While the plan will, by its nature, tend to reduce construction costs, increase production and improve operating efficiency, it is important that the terms of the contracts among the Company, the Partnership, the DOE and others provide a specific commitment by all parties, including the Government, to give highest priority to efficient construction and operation with a view to minimizing capital requirements, ensuring full coverage of all investment obligations including an adequate return to equity investors, and providing a significant payback to the United States Treasury. These contracts should set specific financial targets, e.g., that net revenues shall be sufficient to pay all expenses and debt service, plus an equity return and a specific residual value for the Treasury. Only by clearly setting forth such targets and providing for their periodic review can one enhance the likelihood that they will be attained.

The foregoing financial incentives (coupled with a multi-year appropriation) are of major significance. Without them, there will be constant temptation to change course--to delay appropriations, defer completion, vary construction and operating plans, interrupt output, and generally adopt practices which would increase costs and reduce revenues. In short, the financial incentives provided under the plan are expected to result in significantly higher net income and residual values for the Project, much of which will ultimately become available to the United States Treasury.

G. Revenues from Power Sales

A significant portion of the new private financing is expected to be obtained from the sale of long-term taxable bonds, based upon revenues from power sales during the period from 1990 to 2020. These revenues are an important part of our financing plan.

While the DOE would provide contractual assurances as to revenue adequacy, the task force anticipates that, once the Project is completed, licensed and operating smoothly, the revenues available from power sales will be adequate to cover all operating expenses, debt service and other capital obligations, although some additional borrowings may be required during the start-up period and for several years thereafter to cover possible contingencies.

The task force's expectation that Project revenues will be adequate to support the financings set forth in the illustration in Section B, without drawing significantly upon Federal assurances, is based upon the following:

- A total electric power output of two billion kilowatthours a year is assumed. This is based upon a capacity factor of 65% which appears attainable after a break-in period, given the operating incentives referred to earlier.

- Gross revenues from power sales are estimated at 11¢ per kilowatthour. The 11¢ estimate is on the high side for the first few years of Project operation but is well below projected energy values for most of the Project's life. This is borne out by a survey of utilities in the southeast which was conducted for DOE by The S.M. Stoller Corporation. This survey indicated that average avoided energy costs alone (with no credits for avoided capacity costs), in the Southeastern Electric Reliability Council region, will exceed 11¢ per Kwh by 1997, while peak period energy costs (based on oil) will exceed 11¢ per Kwh in 1993. In either case, the amounts will become significantly higher after the year 2000. If credits for avoided capacity costs are added in, the estimates of avoided costs are in the 14¢ to 15¢ per Kwh range during the 1990's and over 20¢ per Kwh after 2000.

- Fuel and other expenses are estimated at 5.5¢ per Kwh. This estimate is slightly lower than the DOE projections because we expect that the operating incentives referred to earlier will make a 5.5¢ per Kwh target readily attainable, if the Project is managed with an intent to obtain maximum output at lowest possible cost.

- Subtracting 5.5¢ of expenses from 11.0¢ of gross revenues leaves 5.5¢ per Kwh available for debt service and other capital obligations. Applying this figure to the two billion Kwh of annual sales results in an estimate of $110 million of annual net revenues, which will support $1.04 billion of thirty-year debt, assuming interest at ten percent per annum. The assumed interest rate is below current levels, but is high by historical standards.

- The $1.04 billion estimated proceeds from long-term debt financing is reflected in the illustrative tables shown in Section E, below.

- The foregoing projections are dependent on several other assumptions, including those related to interest rates, capital markets, and taxes.

- Whether or not credit for avoidance of new capacity additions can be reflected in future sales of CRBR Project power to ultimate consumers will depend upon the future rates of growth in electricity usage.

- There is always a chance in dealing with a prototype project of this kind that the operating availability will prove to be lower than needed to attain the projected 65% capacity factor.

- For all these reasons, Federal assurances as to revenue adequacy will be required. (See the Appendix).

- Once the CRBR Project is operating smoothly, its costs will be relatively resistant to inflation, while the probable selling price of power will continue to rise.

- After the Project has operated successfully for several years, revenues available from the sale of its power output are expected to exceed the carrying charges on its debt, particularly if oil prices rise or the need for new electric generating capacity materializes,* provided fuel and operating expenses are minimized and power output is maximized. Moreover, the opportunity to reflect credits for avoided capacity in the price of future power sales is an important factor of conservatism.

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* The Southeastern Electric Reliability Council has stated in a letter to Project Management Corporation dated May 20, 1983 that their update of a previous study ". . . shows that there is indeed a more than sufficient market for firm power (capacity and energy) in the amounts designed for the Clinch River Breeder Reactor for the years 1992 and subsequently."

B. An Illustration of How The Financing Will Be Arranged

The following illustration sets forth the possible financing arrangements:

(a) The construction expenditure outlook after FY 1983:

	Millions
o Estimated cost to complete the Project by 1990 (after FY 1983)	$2,400
o DOE's estimate of start-up costs	100
	$2,500
o Funds available from outside private sources	1,000
o Essential Federal appropriations	$1,500

(b) Proposed financing plan

	Millions
o Proceeds of 30-year, 10% bonds issued in 1990 (supported by $110 million of annual net revenues, see Section (c) below)	1,040*
o Deduct interest during construction at an assumed 10% annual interest rate	365**
o Direct construction borrowings	$ 675
o New equity participations	150***
o Funds already committed by utilities and others, including interest (in addition to about $150 million already paid in)	175
Total private funds available	$1,000

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* While our estimates of revenues available to support $1,040 million of debt financing may be on the high side for the early years of Project operations, they

(FOOTNOTES CONTINUED ON NEXT PAGE)

(c) Estimated sales and revenues supporting the revenue bonds

(i)	Sales price per Kwh	11.0¢
(ii)	Deduct fuel and other expenses per Kwh	5.5
(iii)	Net per Kwh available for debt service ("i" minus "ii")	5.5¢
(iv)	Annual Kwh sales in billions (assumes 350 MWe operating at a 65% capacity factor)	2.0
(v)	Annual net revenues in millions available for debt service ("iii" x "iv")	$ 110

(FOOTNOTES CONTINUED FROM PREVIOUS PAGE)

appear to be well within the zone of reasonableness over the entire Project life. Nevertheless, additional working capital may have to be provided through supplemental borrowings to cover debt service and other needs during the shake-down period immediately after completion and for several years thereafter.

** Applying a 10% annual interest rate to construction fund borrowings, with interest figured to mid-1990, the scheduled completion date for the Project.

*** Supported in part by tax credits and deductions and, to a degree, by the prospect of participation in future excess revenues and residual values. The uncertainties and delays in realizing these tax incentives, excess revenues and residual values will limit their immediately realizable value to roughly 15% of total private financings of $1 billion.

I. Comments On The Partnership Approach

In the case of major project financings, conventional tax incentives significantly reduce the tax burden on the income flowing to private investors. That will be true here, too. With a lesser tax burden, the income from the sale of power which is required to provide the private investors with an adequate, after-tax return on their investments will be smaller than it would otherwise need to be.

The private capital used to finance a portion of the CRBR Project here, as elsewhere, should be entitled to the conventional tax incentives typically associated with that investment. These incentives would be measured by the entire private investment. Under the task force plan, the equity participants will receive all of these incentives, because they will receive a disproportionately small share of the Project income. Thus, the equity investment will be supported largely by tax incentives, rather than by Project revenues. The Partnership we propose is the legal conduit through which such tax incentives are typically channelled to equity participants for utilization against their non-project income.

It is estimated that $150 million of equity participation can be supported by these tax incentives coupled with some participation in future residual values (Section B, above). While this capital is equity in the sense that it represents ownership, only a small amount of it would be "risk capital" as that term is commonly used. Equity investors in this kind of project are, for the most part, anticipating specific tax consequences rather than the speculative profit normally associated with risk-taking. Hence, assurances as to the continuing availability of those tax incentives will be required.

The implications of the use of tax incentives as a financing device are discussed in Section K, below.

J. Residual Values

The economic value of the plant's output should increase over time as operating efficiencies are achieved and energy prices advance. For example, the service life may be longer or the revenues larger than needed to liquidate the debt and pay back the equity investors. The possibility of enhancing the Project's future economic value will be improved by the system of incentives described under Section E, above.

If future developments are favorable, the newly-formed American Energy Development Corporation may provide the mechanism for selling common shares at some future time with the proceeds used toward the repayment of the Government's investment. The DOE contracts could, if the government so desired, incorporate a mechanism to achieve this objective.

K. Effect on the United States Treasury

Tax considerations. The conventional tax incentives associated with private investment in plant and equipment--the investment tax credit and deductions for depreciation, research and development and other costs--reduce, but do not eliminate, the tax burden on income from that investment. Measuring the degree of the reduction is complicated by the fact that the tax incentives become available in the early years of project life while the taxable income is reported over the entire project life, so that present value assumptions and computations are required.

Congress has recurrently examined the level of the incentives involved and, after increasing them substantially in 1981, cut them back in 1982 in order to ensure that the tax incentives do not outweigh the tax liabilities. Stated otherwise, 1981 increases in incentives were scaled back in 1982 in response to a specific concern that incentive levels had risen so high that, in some cases, they produced a "negative tax," in the sense that an investment would be less expensive if subject to tax than if wholly exempt from tax. In light of the 1982 legislation, it may be safely concluded in 1983 that, while incentives may greatly reduce the tax burden on such projects, Congress is satisfied that they do not cause the Treasury to "lose money."

It is true, as noted, that the tax incentives are distributed first and the associated tax liabilities are collected later, so that every new private investment causes Treasury tax revenues to be lower initially than they would be had no investment been made (and to be higher subsequently). Viewed alone, each new private investment thus tends to increase the budget deficit at the time it is made, but that is the deliberate consequence of the design of the incentives across the entire private sector and is outweighed by the positive effect on Treasury revenues of a higher level of investment than would otherwise exist.

However, even the initial negative budget effect would be absent in this particular case, as the tax incentives distributed at the outset are only a fraction of the appropriation that would be required from the Government over the same period, if the Project were to proceed without private financing.

No additional incentives are proposed in this case. Only the conventional tax incentives routinely available to all private investment are contemplated.

Non-tax considerations. Rates of return on privately issued debt and equity will be higher than those which would be required on Federal debt. Private borrowing is always more costly than full Government financing since the Federal government necessarily commands the lowest borrowing cost provided by the marketplace. The cost of financing, therefore, would be less were the Government to bear the full cost of the CRBR Project, as would be the case for any business financed 100 per cent by the Government rather than the private sector. That is the unavoidable consequence of seeking private investment in the Project.

Two aspects of this higher capital cost should be noted, however.

First, as in other investments, the financing costs will be covered by the prices paid by the private purchasers of the Project's output. Private financing costs are appropriate in such a case because these are the costs applicable to other privately purchased goods and services. (Financing at Government rates on the other hand, would be appropriate if there were no private purchaser and the Government were itself the user.)

Second, the discipline imposed by the necessity to operate within a profit context and to generate funds sufficient to cover the cost of private financing will produce other economies that should far outweigh the additional cost of private financing. Over the life of the Project, we expect that the United States Treasury will realize a significant net gain under the financing plan proposed here, due to the system of operating incentives described earlier which will minimize construction costs, maximize future revenues, improve operating efficiency over the Project's life, and thus, in all likelihood, provide significant residual values after the private investors have been paid off. These operating incentives, which will be very substantial, are described in detail in Section F, above.

III. THE PURPOSE OF THE NEW FINANCING PLAN

A. The 1982 Congressional Mandate

In December 1982, Congress directed the Department of Energy ". . . to vigorously explore proposals . . . that would reduce Federal budget requirements for the Clinch River Project or project alternative, and secure greater participation from the private sector." (H.R. Rep., No. 97-980 at 186, 97th Cong., 2d Sess., 12/20/82).

The task force has devoted intensive study to alternative financing possibilities which would "reduce Federal budget requirements" and secure "greater participation from the private sector."

The task force plan envisages reducing Federal budget requirements by one billion dollars and raising that amount from the private sector. In our opinion, this is the maximum amount practically available therefrom. The securities sold would be backed by DOE contracts which would have no impact on either budget authority or outlays. The plan would also provide significant long-term benefits to the United States Treasury.

We must stress two important considerations. One of them is that the private utilities and others, which will have paid about $150 million toward the costs of the project by the end of Fiscal Year 1983, will pay $175 million more, including interest, during the construction period, even though the financial condition of many of the utilities has deteriorated since the pledges were made.

Secondly, the CRBR Project is a part of a long range energy program the fruits of which will not ripen for several decades. The benefits of completion of the CRBR Project will be to advance the technology necessary to provide greater assurance of the long term availability to the nation of an adequate and economical energy supply, dependent only upon domestic resources. It is to the Federal government that the people of this nation must look for assurance that there will be adequate and economical energy supplies available in the future. It is only the Federal government that can afford the long look, which risks substantial amounts of seed capital for large, but distant, public benefits.

B. What The Plan Can And Cannot Do

Budget outlays. It is clear that the financing plan proposed will result in a significant reduction of Federal budgetary outlays at a time when budget deficits are of critical importance. Moreover, it can result in significant net benefits to the United States Treasury, for reasons set forth in Section II-K, above.

Risks. While the Project or its equity participants may be able to assume those plant operating risks which can be carried by commercially available insurance, the new plan cannot relieve the Federal government of the broad Project risks because, as a practical matter, responsibility for funding, constructing and licensing the Project and assuring revenue adequacy must remain in the Federal government for reasons set forth below.

C. Limitations on Private Investment

The uncertain history of the Clinch River Project forecloses it from general access to the private capital markets without the Federal assurances set forth in the Appendix. In addition, in today's environment, our system of state utility regulation prevents significant added participation by the nation's electric utilities. In this period, when electricity prices have a high profile and electricity price increases encounter great public resistance, utility commissioners are loath to authorize the recovery of contributions to demonstrate advanced technologies which will not provide benefits to ratepayers until several decades hence. Moreover, the utilities themselves cannot afford to support such efforts at stockholder expense.

D. Some Observations On Investment Risk

Availability of risk capital. The amount of private investment capital available for a given project varies inversely with the perceived risk. Maximum funds are available for investments thought to have the least risk of non-repayment, such as securities of the United States Treasury, while relatively little money is available for ventures of high risk. In fact, these cease to be "investments" and become "speculations" appealing to a limited class of high risk takers. While the market provides substantial risk capital for speculative ventures, most of such venture capital is available only for high technology and other enterprises at the frontiers of development, and on terms which provide investors with an equity stake in a potentially promising future. No venture capital is available for investments perceived to involve high risk, modest return, and small opportunity for speculative gain.

As a long-term national research and development effort, the CRBR Project does not offer such an equity stake or the possibility of significant speculative gains to investors.

Additional financing sources. It seems clear, therefore, that no significant amounts of "risk capital" will be available to the CRBR Project. Instead, whatever private market funding is provided for the Project will be in the nature of "project financing" in that the credit therefor will be derived wholly from the Project assets and revenues and from agreements and warranties associated with those assets and revenues. This is to be distinguished from conventional financing where a credit-worthy going concern, such as a large industrial corporation or utility, raises funds on its general credit for investment in particular assets or activities.

The major market for such long-term project financing lies with institutional investors such as insurance companies, pension funds, banks and other institutions. Most of these institutions are fiduciaries which are held to strict accountability, frequently restricted in their discretion by statute or regulation, and averse to high risk investments. While they seek to maximize return, their first concern is preservation of principal. Their fiduciary responsibility will prevent them from making an investment where repayment of principal and payment of interest is in substantial doubt. There is a lesser market among individuals who make fixed return investments.

In the United States, investors are under no compulsion to accept a security which does not fulfill their investment objectives. An offering must attract their participation in competition with a vast array of alternative investments in which the yield varies in relation to the perceived degree of risk.

Capital market risks. Long-term fixed income securities such as we are proposing be issued are vulnerable to erosion in value because inflation or currency devaluation reduces the real value of all dollar denominated investments. Long-term investors in this country have borne the risk of inflation during recent years and have suffered severe consequences. They have also borne the related risk of changing interest rate levels and have suffered accordingly as the value of their fixed-return investments declined because, in making long-term commitments, such investors forego the opportunity to make more attractive investments which may come along, and, if they wish to sell, they must do so at a heavy loss of principal.

These are all capital market risks, which are wholly apart from the project risks. These are the risks which the proposed financing plan places on investors.

Project risks. On the other hand, there are certain investment risks which are inextricably tied to the CRBR Project. When the regulatory and other risks associated today with all nuclear investments are considered, plus the fact that the CRBR Project involves an experimental type of reactor with a commercial pay-back deferred far into the future, and that it has suffered from a long history of political indecision and controversy, it must be concluded that no significant amount of private investment will be obtainable unless the project risks (as distinguished from capital risks) are eliminated. Such risks may be defined as risks that the Project will not be completed and operated as planned and will not produce the funds required to meet the Project's capital obligations. Only the Federal government has both sufficient credit and a sufficient public responsibility to support this basic research and demonstration Project and assume these project risks.

It is for these reasons that the task force believes the credit assurances set forth in the Appendix are necessary to conform project risks to those applicable to conventional investments. These assurances will not be called upon unless specified contingencies occur; accordingly, they are not subsidies.

In our judgment, securities backed by DOE contracts would be readily marketable in the private sector for the amounts required and without any budgetary impact.

IV. CONCLUSION

Congress has asked for a plan to provide private sector funding for a significant portion of the CRBR Project, as an alternative to funding the entire Project through direct Congressional appropriations and hence increasing already large budget deficits.

The task force has submitted such a plan and is taking steps to implement the plan to the fullest extent possible prior to enactment of enabling legislation. These steps include incorporating the American Energy Development Corporation for purposes described earlier, recruiting executive personnel, preparing Partnership organization and financing documents, and obtaining letters of interest from potential power purchasers, investors and investment bankers.

We therefore urge that the legislation needed to permit our proposals to be fully implemented be adopted promptly.

Respectfully submitted,

The BRC Task Force

By: Gordon R. Corey
Gordon R. Corey, Chairman

Task Force Members:

John W. Barr
Principal
Morgan Stanley & Co. Incorporated

George B. Campbell
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William H. Grigg
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Edwin A. Lupberger
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  Sidley & Austin

June 23, 1983

APPENDIX

FEDERAL ASSURANCES REQUIRED

The following assurances must generally be provided incontestably:

1. Assurances as to completion, licensability and operability

   Governmental contracts to provide sufficient funds to repay all construction loans, private equity and other investments in the Project if it is not completed satisfactorily, fully licensed and placed in commercial operation in a timely fashion, in which case the investors would be entitled to recover their capital plus interest or a return thereon.

2. Assurances that all debt service obligations of the Project as well as its obligations to equity investors will be met under any and all circumstances

   Governmental contracts to provide sufficient funds to cover all obligations to private investors plus all construction and operating costs, taxes and other claims, with respect to the CRBR Project, and to receive a portion of the proceeds from the sale of the power and any other revenues from the CRBR Project up to the amount of such funds, whether or not there are any such other revenues or power.

3. Assurances that all tax credits, deductions and other tax incentives, related to the privately-financed portion of the Project, will be available to the private investors as planned

   Governmental contracts to provide sufficient funds to make appropriate repayments to private equity investors if tax incentives are not made available as planned.

4. Assurances against liabilities for replacement power costs and all uninsurable tort liabilities, resulting from the CRBR Project

   Governmental contracts to provide such assurances.

APPENDIX D

CRBRP COMPONENTS AND SITE PHOTOS

Aerial View of the Site Area

Site Excavation Activities

Rock Crusher Plant

Reactor Vessel

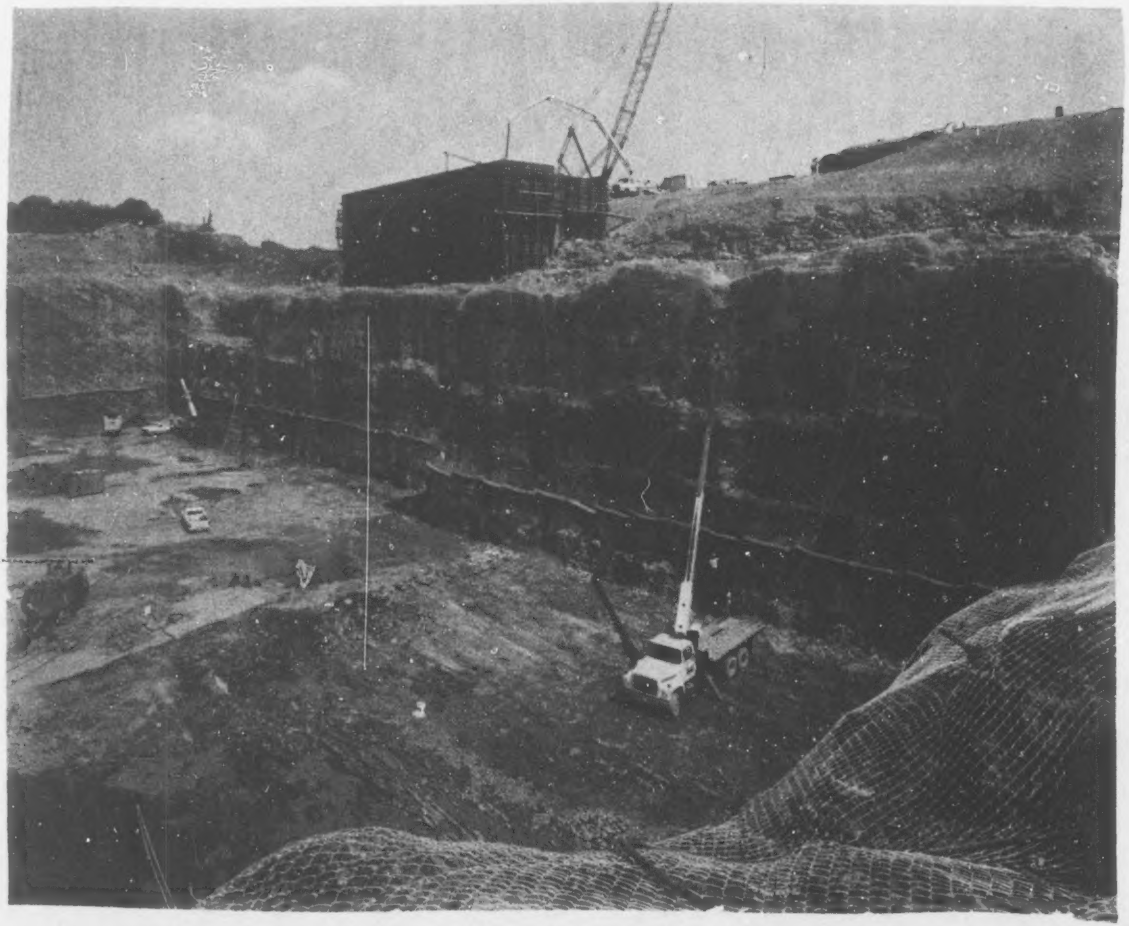
Reactor Vessel Head

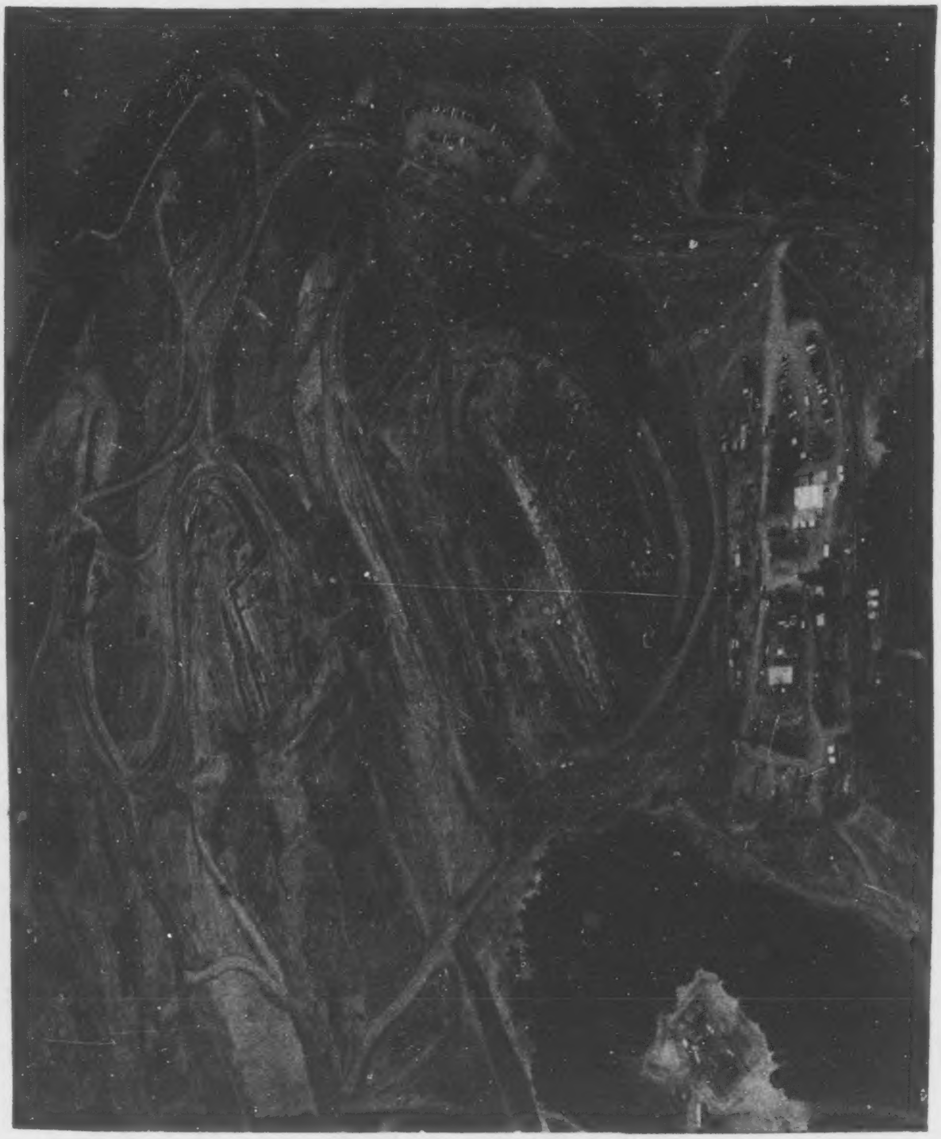
Heat Exchanger

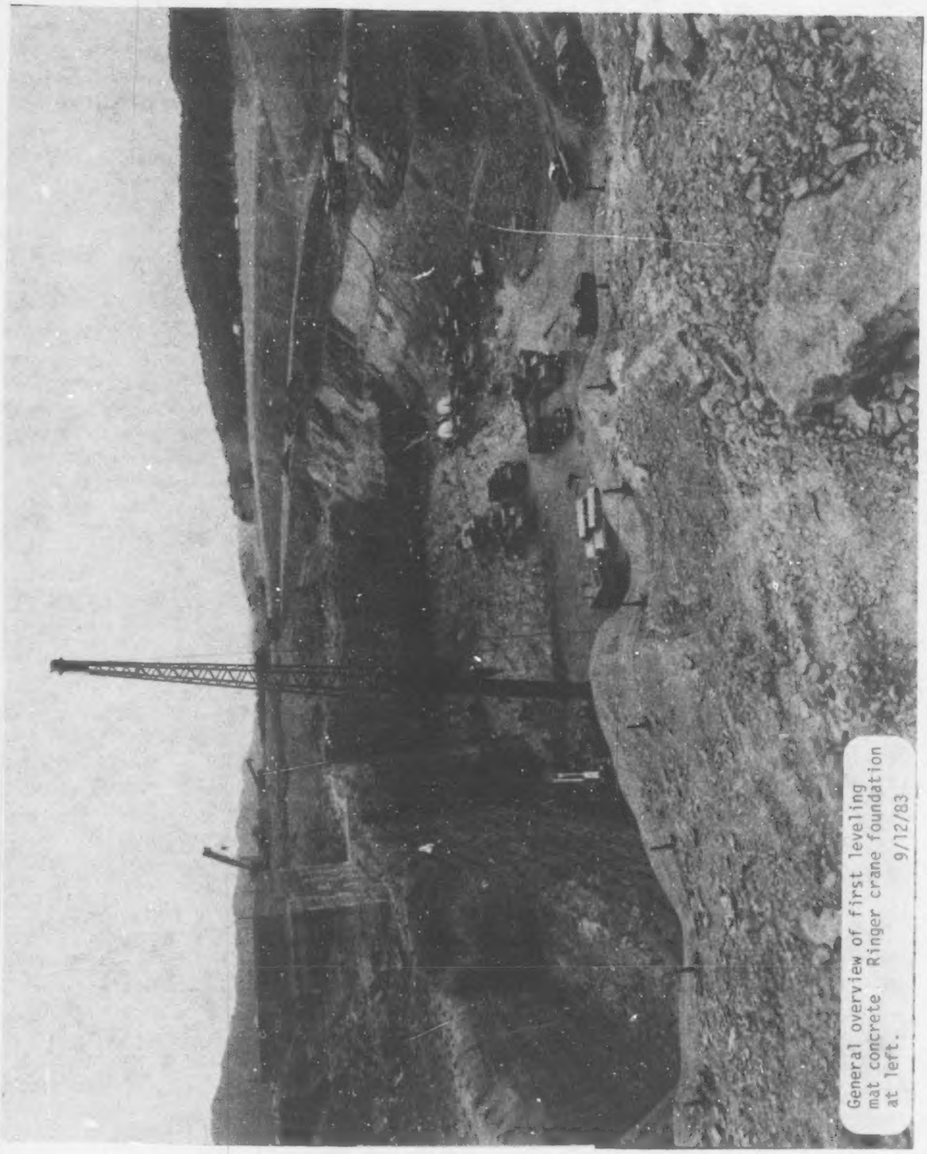
Sodium Pump

Steam Generator

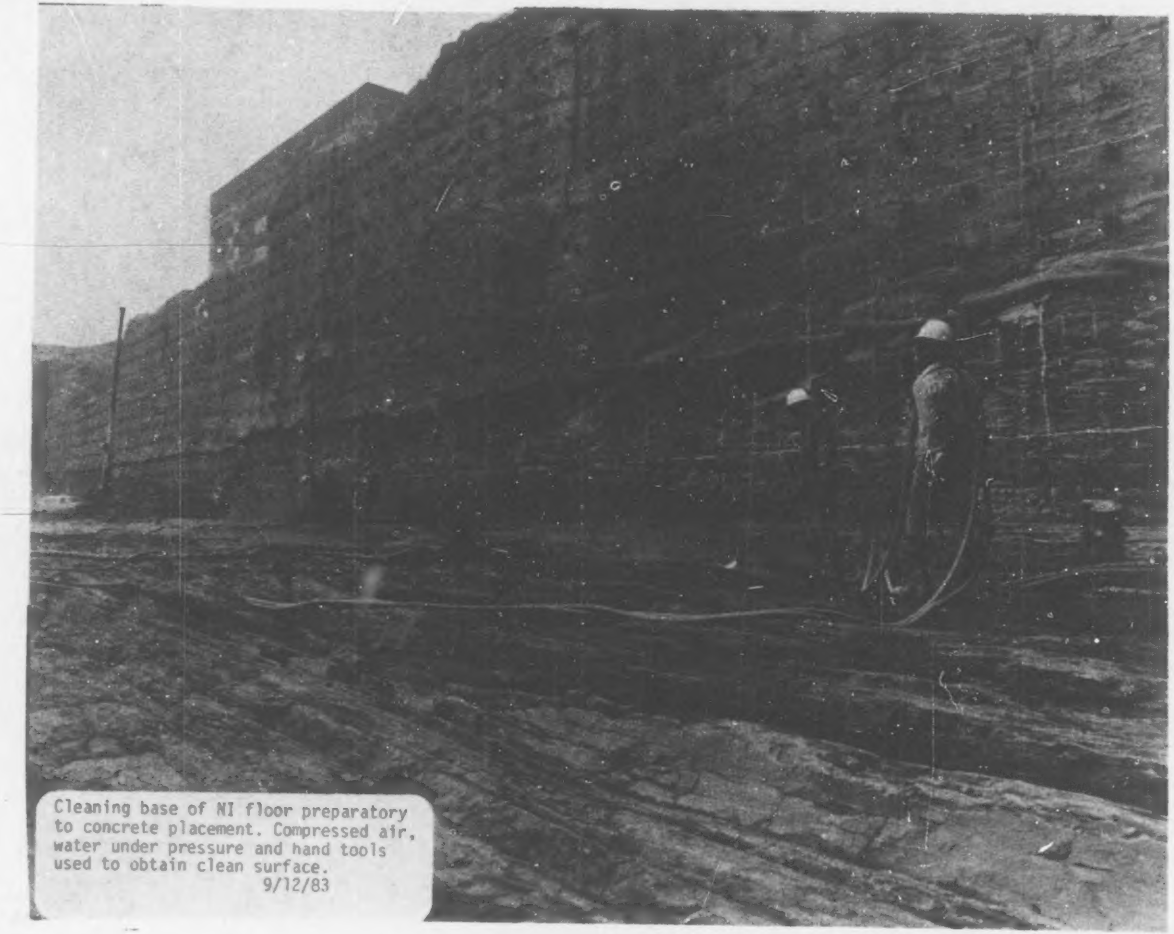
Separator Tanks



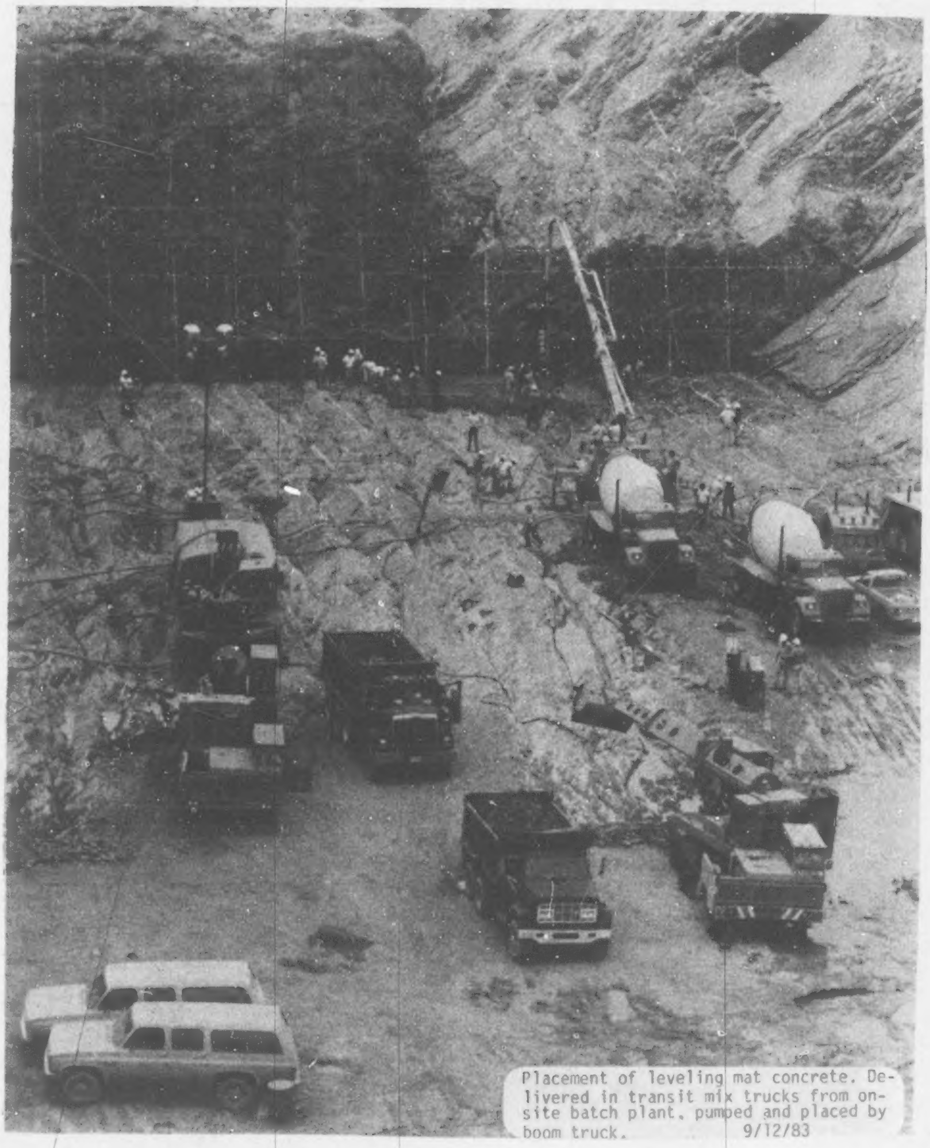




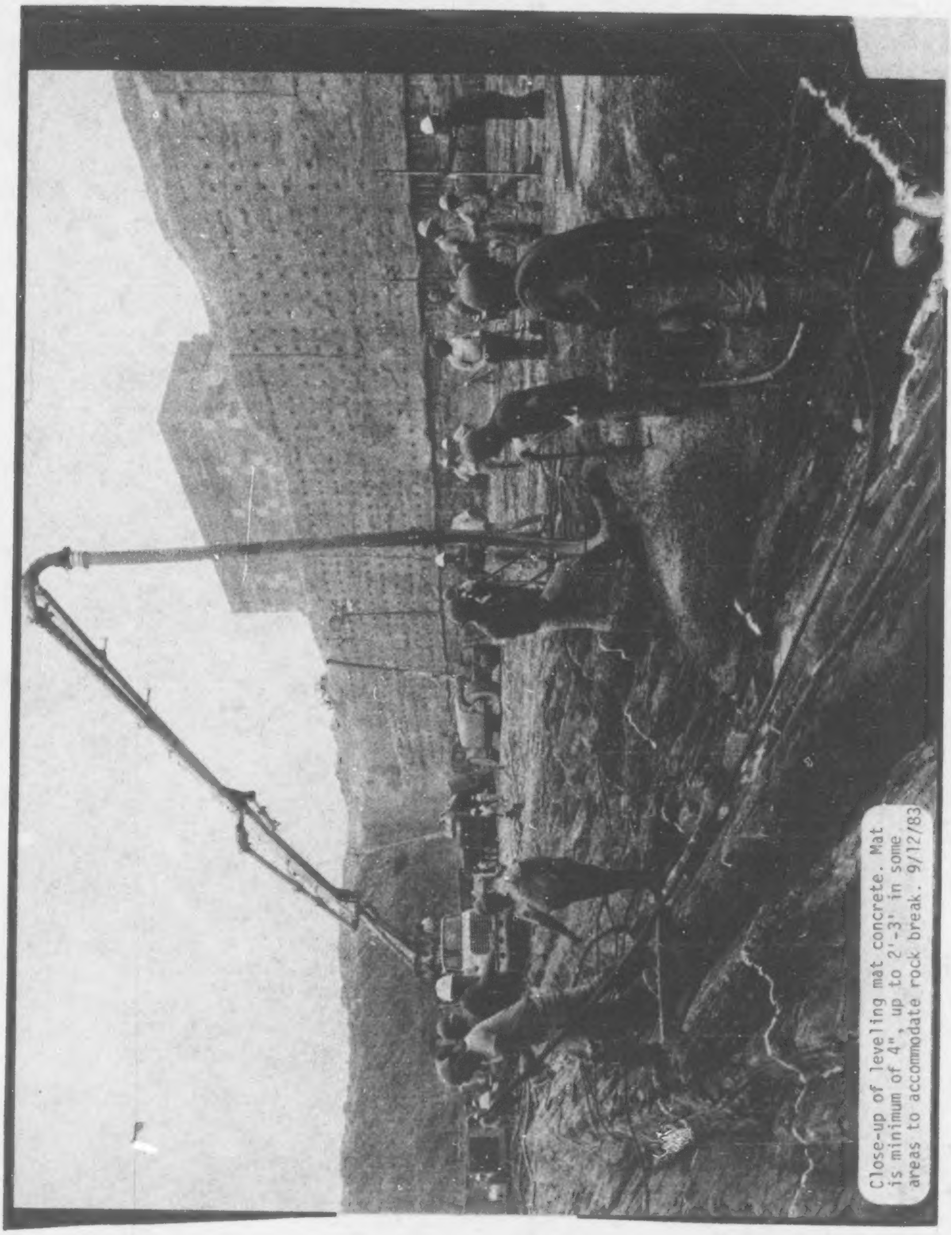
General overview of first leveling mat concrete. Ringer crane foundation at left. 9/12/83



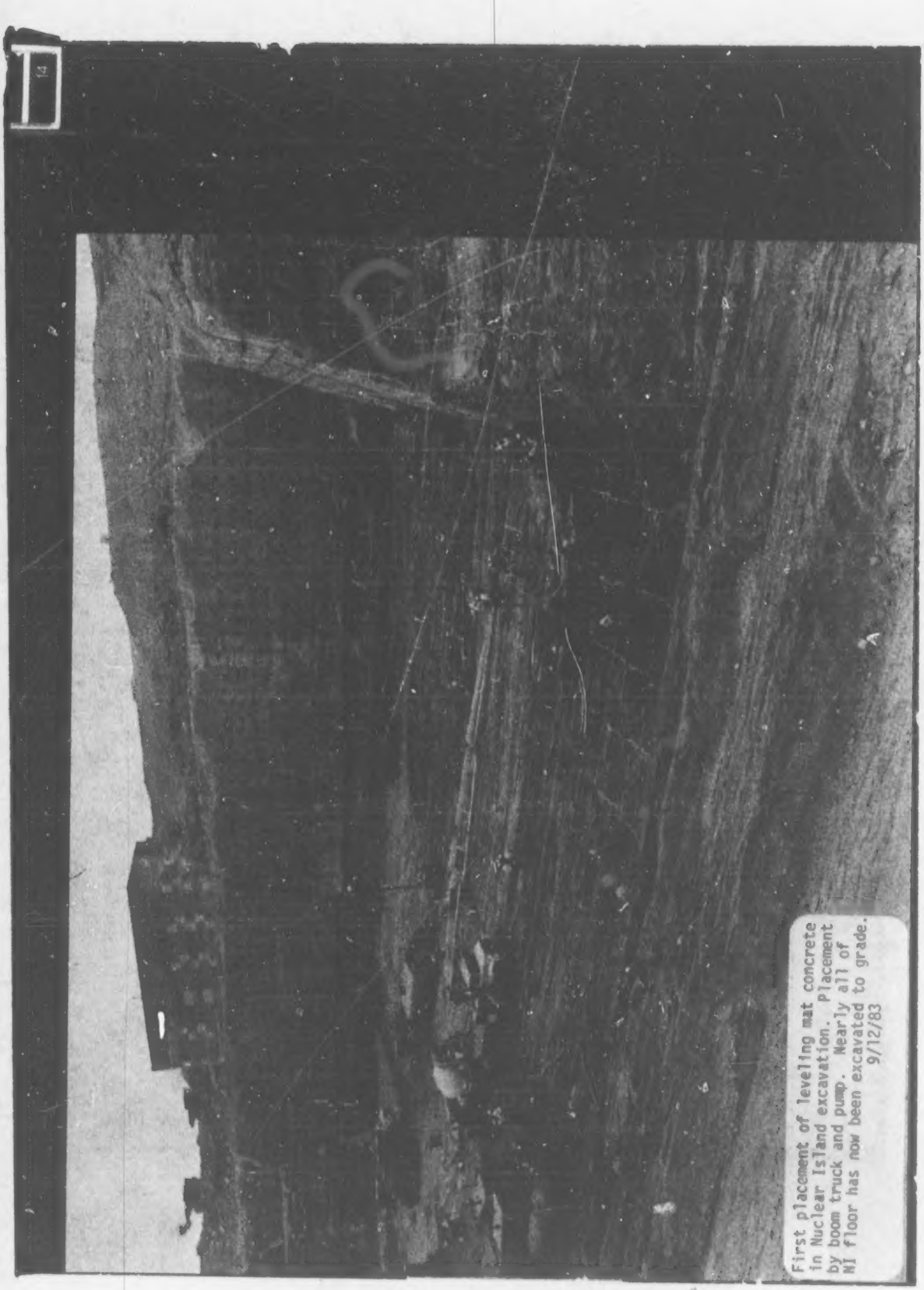
Cleaning base of NI floor preparatory to concrete placement. Compressed air, water under pressure and hand tools used to obtain clean surface.
9/12/83



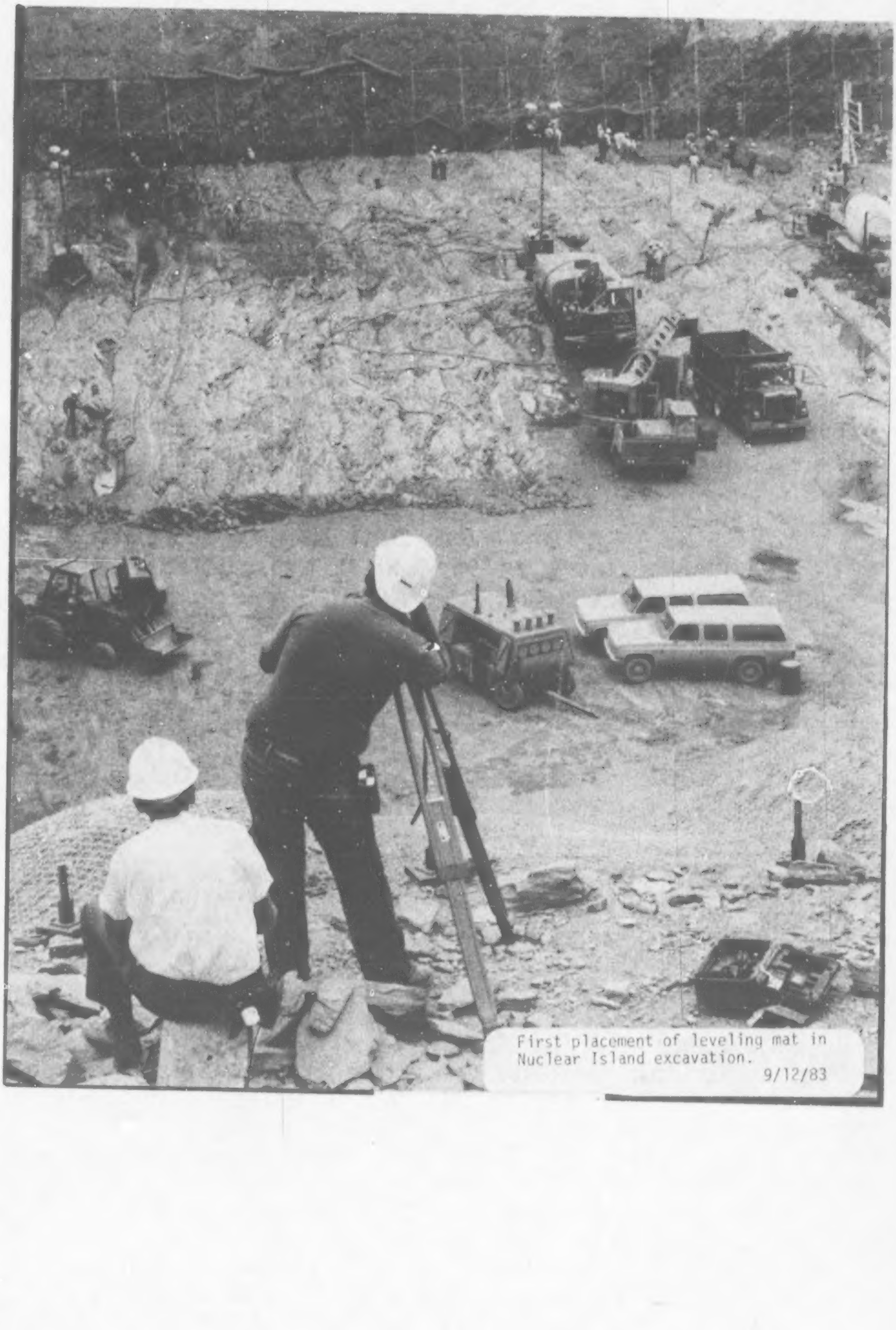
Placement of leveling mat concrete. Delivered in transit mix trucks from onsite batch plant, pumped and placed by boom truck. 9/12/83



Close-up of leveling mat concrete. Mat is minimum of 4", up to 2'-3' in some areas to accommodate rock break. 9/12/83



First placement of leveling mat concrete in Nuclear Island excavation. Placement by boom truck and pump. Nearly all of NI floor has now been excavated to grade.
9/12/83



First placement of leveling mat in Nuclear Island excavation.
9/12/83

Mrs. LLOYD. We now have a panel of guests that we would like to welcome to our hearing today. We have Ms. Jill Lancelot, who represents the Taxpayers Coalition Against Clinch River. Now, she will be accompanied by Mr. Fred Smith, who is council for Competitive Economy. We also have Mr. Robert Georgine, who is chairman, Committee on Jobs, Environment and Technology. He is president of the Building & Construction Trades Department of the AFL-CIO. And Mr. Georgine is accompanied by Ms. Susan Davidson, and she represents International—she is representing the international president of General Federation of Women's Clubs. And we are also happy to have with us Mr.—excuse me, the executive director is representing—Mr. Alexander, representing Mr. Ford of the National Conference of Black Mayors.

I hope I got your introduction right. If not, we will certainly correct it.

We welcome you to our hearings today. We will hear from Ms. Lancelot at this time. Please proceed.

STATEMENTS OF JILL LANCELOT, DIRECTOR OF CONGRESSIONAL AFFAIRS, NATIONAL TAXPAYERS UNION, ACCOMPANIED BY FRED SMITH, DIRECTOR OF GOVERNMENT AFFAIRS, COUNCIL FOR A COMPETITIVE ECONOMY, AND ROBERT A. GEORGINE, PRESIDENT, BUILDING & CONSTRUCTION TRADES DEPARTMENT, AFL-CIO, AND CHAIRMAN, COMMITTEE ON JOBS, ENVIRONMENT AND TECHNOLOGY, ACCOMPANIED BY SUSAN DAVIDSON, ON BEHALF OF THE INTERNATIONAL PRESIDENT, GENERAL FEDERATION OF WOMEN'S CLUBS, AND J. STANLEY ALEXANDER, DIRECTOR, WASHINGTON OFFICE, NATIONAL CONFERENCE OF BLACK MAYORS, INC.

Ms. LANCELOT. Thank you. May I ask one question? Are Fred and I sharing this 10 minutes, or do we have 10 minutes each?

Mrs. LLOYD. You have 10 minutes according to the rules that were outlined at the beginning of our hearing this morning, however you would like to proceed.

Ms. LANCELOT. All right, thank you very much.

I am Jill Lancelot, of the National Taxpayers——

Mrs. LLOYD. Just whatever you prefer, the 10 minutes is yours.

Ms. LANCELOT. I am with the National Taxpayers Union, director of the Congressional Affairs Office. Fred is——

Mrs. LLOYD. Pardon me. Would you speak in your microphone a little bit more?

Ms. LANCELOT. Fred is director of the Government Affairs Office at the Council of Competitive Economy.

We are here, and delighted to be here, speaking on behalf of the Taxpayers Coalition Against Clinch River. The coalition has 16 different very diverse organizations. And although we have differing views regarding nuclear power, we are united in our opposition to this project.

We are hard pressed to understand why we are once again addressing the Clinch River issue when Congress made it very clear that the business-as-usual attitude must end when they voted to defund this project.

Moreover, it is distressing that this administration which purports to abide by the principles of the free market, continues to support this project. The Dave Peter Grace Commission, the President's own private sector survey and cost control, questioned the wisdom of further Clinch River funding. Unfortunately, the administration has ignored those findings.

The plan that we are addressing today is a failure. Instead of the private sector assuming more of the Clinch River cost as requested by Congress, it merely shifts the Federal costs to the off-budget sector. This shift, coupled with a $1.5 billion Federal appropriation request, is hardly cost sharing. True cost sharing would provide up front, hard cash from industry as well.

Had this plan been based on the original model, we would of before—we would have before us a true cost-sharing arrangement. Instead, we have a plan that leaves the taxpayers holding the bag. Although the $1.5 billion congressional appropriation is convenient for legislators since it removes this controversial issue from the legislative agenda, it does nothing to reduce the cost to the taxpayer.

Further, and by approving multiyear funding, it effectively shields the project from scrutiny since Congress will surrender the right to oversight. The $175 million that will be contributed by the utilities does not represent any new contribution. It is merely the amount that has not been paid from the original $257 million pledge.

The original pledge was a private sector vote of confidence. If the project failed, the contribution was lost. The current plan seems to eliminate this by providing Federal assurances of repayment should the project fail.

The $150 million of equity shares is not an investment of any new private sector venture capital but rather represents the cash approval and of tax benefits. Thus, the Federal Government is paying for the private contribution by lowering its tax revenues.

In addition, the plan appears to give Federal Government assurances that all tax incentives will be available to the investors as planned. No private sector tax shelter provides such assurances. The hundred—the $675 million interim financing loans will be paid from the proceeds from bonds to be issued in 1990. Revenues from the sale of electricity produced by Clinch River will be pledged as security in a region where five nuclear powerplants have been canceled as a result of an oversupply of electricity. Certainly a lesson should be learned from the collapse of WPPSS which was brought on by the overinvestment in generating capacity in the Pacific Northwest.

It would be folly to commit the public once again to bonds that are guaranteed on the basis of the sale of power to a region that is already saturated with electricity.

The fact of the private sector remains unwilling to share the costs that are being borne by the taxpayers certainly casts grave doubts on the commercial feasibility of the project.

What we have here is not a genuine cost-sharing plan but a disingenuous one. It is only an inducement to attract private capital by demanding that the Federal Government assure that the plant will be constructed, operated, and licensed on schedule. And that every dollar of private investment will be repaid with interest by the U.S. Treasury if the project is not successful.

Thank you. Fred?

Mrs. LLOYD. Mr. Smith?

Mr. SMITH. Yes, ma'am.

You've heard a lot about the details of this plan and its efforts to hide, distort, and so forth. We are told this technology will generate electricity. Well, of course, a lot of things will generate electricity if you ignore economic reality. You can make a silk purse out of a sow's ear but in the market most manufacturers still use silk.

The—we are told that the current numbers are hard and fast, but not enough to ask industry to commit true-risk capital. Ninety percent of the way through the project we are still not sure. Some money will go to the project. But, of course, the money is for the guarantees, not the project itself.

I have argued, and not facetiously, but if the Clinch River project were making mud pies, it would attract exactly the same level of private sector financing.

Moreover, by guaranteeing the investment, we are undermining, we are eliminating the incentives necessary for any new, any complex technology to work—prove profitable. We are actually weakening the possibility this project will work.

You have heard a little bit about the tax benefit question; tax policy is very complicated, and there's certainly room for confusion there. And we didn't have a million dollars—tax dollars to develop a true free market cost-sharing plan, but let's say something. As I understand what the purpose is of tax shelters or tax benefits is to encourage entrepreneurial risks—we see no entrepreneurial risks or any other form of risks in this project, why are we even talking about tax benefits?

These details, these trees are important. But let's step back and see what kind of a forest we are considering. In the private sector, if you want to build a powerplant, you go to your investment banker; you don't go to your Congressman. And when you get there, you show him signed contracts, letters of intent, engineering feasibility studies, earnest money; you don't show him full page ads in the Washington Post.

In the private sector, investors take risks. Lots of things can go wrong. If they are right, they can make a lot of money. But if they are wrong, they can lose their shirt. There are no hell-or-high-water guarantees in the real world.

I discussed this issue recently with Senator McClure. Many of you know he's a conservative and a proponent of this project. The Senator argued the industry case vigorously and as well I think it justified, but kept talking about the free enterprise plan. I think he might have mentioned the French leadership and how Mitterand was involved with this. Well, Mitterand is no friend of economic freedom. After a bit I noted that this plan is a bit like socialism wearing an Adam Smith tie. I wear an Adam Smith tie but I know what it means.

Energy policy is of two kinds. We went through an era of bad rhetoric: the market doesn't work and bad policies; subsidize and regulate everything. But the Reagan administration issued in an era of what our group, the council for competitive economy, believes is good rhetoric: the market works, let it do its thing. Unfortunately, we still have the same bad policies: subsidize Clinch.

Isn't it time that the administration brought their policies in line with their rhetoric?

Let me conclude that—by arguing that I believe a return to principles would be a good thing, would be valuable for the nuclear industry as well as the Nation.

The nuclear industry's Faustian deal with Government receives subsidies and caps on liabilities in return for an industry/Government partnership foreshadows many of the problems with national industrial policy has been a disaster for both the industry and the Nation. Increasingly, the leaders of this industry have become second-class politicians rather than first-class competitors. They have found themselves increasingly in dead end technologies with nowhere to go. I mean, this dead end technology is something that's become a reason to go on with the project. It's a symbolic issue now. Some symbol.

We are symbolizing that an industry that can't even cross the financial street without having Government cross—carry—hold its hand.

I don't know what the nuclear industry would look like had it taken the free enterprise approach. I do know that the current industry looks distressingly like a carpet, welfare basket case. Government aid has not been good for the industry.

I think you and us ought to put the industry back on the road to health by taking them off the dough. Why don't we stop Clinch River today?

I thank you.

I would like to have my—the full remarks, if we could, put into the record.

Mrs. Lloyd. Without objection, your remarks will be made a part of the record.

[The statement of Ms. Lancelot and Mr. Smith follows:]

TAXPAYERS COALITION AGAINST CLINCH RIVER
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STEERING COMMITTEE
- National Taxpayers Union
- Natural Resources Defense Council
- International Association of Machinists and Aerospace Workers
- Friends of the Earth
- United Methodist Church: General Board of Church and Society
- United Steelworkers of America
- Rural America
- National Audubon Society
- Sierra Club
- United Church of Christ: Office for Church and Society
- Council for a Competitive Economy
- Union of Concerned Scientists
- Congress Watch
- Environmental Policy Center
- Church of the Brethren: Washington Office
- Environmental Action
- New Jewish Agenda

Joint Statement of
Jill Lancelot, Director of Congressional Affairs
National Taxpayers Union

and

Fred Smith, Director of Government Affairs
Council for a Competitive Economy

before the

Subcommittee on Energy Research and Production
House Committee on Science and Technology

on

Alternative Private Financing Plan for the
Clinch River Breeder Reactor Program

September 15, 1983

STOP TAX WASTE!

I am Jill Lancelot, Director of the Congressional Affairs Office of the National Taxpayers Union; Fred Smith is Director of Government Affairs for the Council for a Competitive Economy. We are speaking today on behalf of the Taxpayers Coalition Against Clinch River concerning the Breeder Reactor Corporation's (BRC) June 23, 1983 report on alternative financing possibilities for the Clinch River Breeder Reactor (CRBR) project.

The Taxpayers Coalition includes 16 different organizations which represent millions of Americans; we are a diverse group including taxpayer, fiscal conservative, labor, business, environmental, consumer, church and scientific groups. We may have differing opinions with respect to nuclear power, but are all united in our opposition to this project.

Over the last two years, the Coalition has played a major role in providing the facts concerning the costs and benefits of this project to the American people and their elected representatives. In part because of our efforts, many groups have come to question the economic, political and/or technical rationale for this project. These include spokesmen from the Heritage Foundation, the American Enterprise Institute, and the Federation of American Scientists; the National Review and the Reader's Digest; the League of Women Voters and Coalitions for America; the United Mine Workers and Free the Eagle. Senators such as Gordon Humphrey and Dale Bumpers and Congressmen such as Howard Wolpe and Vin Weber — liberals and conservatives, Democrats and Republicans — all have joined in opposition to the Clinch River program.

As representatives of the Coalition, we appreciate the opportunity to present our views today.

Background on the Clinch River Project:

When the Clinch River Breeder Reactor was first initiated in the early 1970s, there was some rationale for its construction. Electricity demand was increasing rapidly and nuclear power was expected to supply an increasing percentage of that demand. Moreover, known uranium reserves appeared extremely limited and many were pessimistic about the prospects for new discoveries. All these factors suggested that uranium might become extremely expensive. Based on this scenario, the case for some alternative fuel source appeared compelling. As we shall later discuss, reality did not follow this course.

However, it is important to note that even in these early days, the project was considered a demonstration project similar to the earlier light water reactor demonstration program of the 1950s. Those that would benefit from this project -- the nuclear utilities and the nuclear vendors -- were expected to pay a substantial portion of all costs. Government was thought to have a role in the basic and applied research fields, but was thought to have little role in the economic testing and validation of the resulting technologies.

This finding was most recently endorsed anew by the findings of the President's Private Sector Survey on Cost Control (the Survey headed by Peter Grace) in its review of the Department of Energy's programs. Their report noted that "Federal R&D responsibilities do not call for the demonstration of existing technology as a major step toward commercialization, because that step should be taken by the private sector whenever it deems that the time is ripe." The Grace report went on to note that ". . . . Nevertheless, some very large, current DOE programs fall into this [demonstracion] category -- the Clinch River Breeder Reactor (CRBR) Program . . . Each involves the prospective investment of additional billions within the next few years, and each should be reviewed." Federal funding of this project has always been in conflict with the view that the private sector, not government should determine which technologies and when these technologies should be brought to the market place.

Limiting the role of government in the commercialization area is important. Many studies have found that government is particularly inept when it comes to replacing the incentives necessary for technology to survive a market test. A recent survey reported in Science, "Industrial Innovation Policy: Lessons from American History," concluded that: "A fourth type of policy, under which the government attempts to pick winners, has been a clear-cut failure." Government's failure in this area should not be surprising. Commercial success requires that the technology meet a market test, a test that government is poorly equipped to pass. The incentives and knowledge necessary for a project to succeed are unlikely to be acquired by a hired hand. Entreprenurial success is a field in which individuals, not bureaucracies, excel. As we later show, the chances that the Clinch River project would ever be successful have been further diminished by this new plan.

As noted, the original breeder demonstration program anticipated rapid increases in the price of uranium. That expectation never materialized, but it did trigger new efforts to discover and exploit new supplies of uranium. These were successful. Moreover, nuclear technology improved and in fact is still improving in ways that allow greater energy to be extracted from a fixed quantity of fuel. Uranium goes further now than it once did. But most significantly, the delivered costs of electricity from nuclear plants began to increase rapidly. That increase, however, was not due to any increases in fuel costs, but rather to a drastic increase in the capital costs of constructing nuclear power plants. Moreover, the OPEC crisis triggered a general increase in the price of energy and led to a sharp reduction in the level of energy consumption per unit of economic activity. This price-induced conservation forced all utilities to reassess their capital expansion plans. Increasing costs of nuclear power plants made them special candidates for cancellation. Early optimistic estimates by the nuclear industry that some 1,400 reactors would be on line by the year 2,000 were slashed -- we now anticipate that only some 150 are likely to be operating in that period.

The cumulative impact of all these factors has destroyed the economic viability of the Clinch River project and makes it extremely unlikely that any breeder technology is likely to be commercially viable in the near future. And again this point is not disputed by most objective observers. The most recent and dramatic confirmation of the scenario sketched out above was provided by Dr. Donald Rice, President of the Rand Corporation, in response to a letter requesting the views of the Rand staff on the merits of the Clinch River project. Rice enoted that the fundamental issue was whether the CRBR project constituted "the best path to meeting long-term national energy goals and a sound strategy for ensuring that nuclear energy supply options are avaiable as needed." Rice identified five conditions he believed must be met for this question to be answered affirmatively:

* Electricity demand would have to increase at a rapid rate over the next two decades.
* The number of light water reactors operating in the 1980s and 1990s would have to be large and increasing.
* Projected uranium prices would have to be much higher than current prices.
* Some cost-effective means of reprocessing fuel would have to be available.
* No superior breeder technology should be available for demonstration.

Rice pointed out: "At this time, neither we nor most observers believe that any of these conditions hold," and urged that ". . . we eschew commiting ourselves to the CRBR and the strategy that it embodies."

Naturally, these problems did not emerge overnight. Indeed, the Rand statement summarized above restated concerns that Rand had expressed some eight years earlier to the director of the Energy Research and Development Administration. But as the costs of the project have increased, and the benefits have faded away, there has been little willingness on the part of the Clinch proponents to reassess the wisdom of proceeding. Instead they have sought an open-ended commitment from the U.S. taxpayer.

That refusal to face reality has led to the political fight over funding that continues to this day. But there has been some progress. Both the House and Senate have eliminated funds for CRBR from the Fiscal Year 1984 Energy and Water appropriations bill until such time as an acceptable cost-sharing plan can be defined and enacted. DOE was given explicit instructions to reduce the federal share of CRBR funding by soliciting additional private sector financing. The legislative language required DOE to "vigorously explore proposals, including a reconsideration of the original cost-sharing arrangement that would reduce federal budget requirements for the Clinch River project."

That original arrangement, we might recall, required the utilities and the nuclear vendors to pay 40 percent of the project's total anticipated cost of $700 million in exchange for the free access to what remained a totally government-owned facility. Had the DOE-BRC report provided us a plan patterned after this original model, we might be considering a true cost-sharing proposal.

Unfortunately, the plan that DOE and BRC have produced fails totally to consider such an option. Their "cost-sharing" plan is neither that nor a cost-reduction plan but rather an alternative financing scheme. Asked to reduce the impact on the U.S. taxpayer, they have responded with a "creative financing" package instead. As Shelby Brewer, Assistant Secretary of Nuclear Energy, has admitted, the plan . . . "is simply moving money around in time." Costs are moved off-budget and paid in different ways, but the Clinch River burden on the taxpayer is left unchanged. The plan provides no new private money and requires the private sector to assume no new risks. The defined "new" funding is obtained from the sale of assets now assigned to the federal government, from reduced tax collections, or from new federal guarantees. Regardless of plant performance, every dollar of private "investment" will be repaid with interest from the U.S. Treasury. An investment that pays off even in the event of failure is not typical in the private sector.

The initial variant of the cost-sharing plan was submitted to Congress in March where it met a chilly reception. That plan was critiqued by the General Accounting Office (GAO). GAO observed: " . . . while the proposal will probably change many of the existing project arrangements, the federal government appears to retain most of the risk if the project fails or if the cost overruns occur." That plan was returned for revision, but the version we now have before us is merely the old plan with a new date. The claims of the BRC Task Force that this plan "embodies a specific plan for raising $1 billion of private capital" and that "one billion dollars represents 40 percent of the estimated remaining cost to complete the project" have been heard before. The only difference today is that the industry has decided to say it louder. The nuclear industry may not believe in Clinch, but they certainly believe in PR. The display ads in the Washington Post yesterday say much about their faith in that approach.

The plan itself defines four separate financing elements that sum to the projected $2.4 billion price tag for completing the project. Needless to say, only the federal government has any liability if the project exceeds this figure. And those who believe that this estimate is hard and fast will probably believe other things. Let us consider each component.

1. A DIRECT GOVERNMENT MULTI-YEAR APPROPRIATION OF $1.4 BILLION:

Under the plan, Congress will appropriate $1.4 billion in a one time multi-year appropriation. These monies will be disbursed as needed over the seven year construction cycle. The primary problem with this feature of the plan is that it removes the project from subsequent congressional review. Many things can happen over the next seven years that might lead rational men to reconsider the wisdom of spending further taxpayer revenues on this project. Indeed, some have already come to such a conclusion. And this fact — nothing else — explains the rationale for multi-year funding. The merits of Clinch are non-existent already and this fact has become apparent to almost everyone. Over the next few years, the costs of this project are likely to mount still further while the benefits are likely to drop. The Clinch proponents wish to avoid any further scrutiny of this project and thus have elected this approach. Needless to say, nothing in this provision of the plan reduces in any way the costs of this project to the taxpayer.

2. A UTILITY CONTRIBUTION OF $175 MILLION:

The utilities that have participated in the Breeder Reactor Corporation are to provide $175 million to the project. However, this amount is simply the commitment they have already made to the project less that already contributed adjusted for interest payments. This is the amount already owed but not yet paid to the CRBR under the terms of the original agreement. Over the last several years, utilities have been extremely reluctant to advance any more monies to this project. In fact, utilities have made no contribution since 1977. This scarcely indicates their confidence in Clinch.

The current plan may well signal a reduced commitment on the part of the participating utilities, and thus a lessened involvement by the private sector in the overall financing of Clinch. The original pledge was a private sector vote of confidence in the value and feasibility of the project — if the project failed, the utilities would lose their investment. The current plan seems to provide assurances that in such an event, the utilities would be reimbursed. This point should be clarified. Exactly what is the nature of the investment by the utility companies under this "new" plan. Are the risks to be borne by the utilities the same as they were under the original scheme or not?

And there is one other disturbing factor related to the utility involvement. Even if Congress approves this plan, we have no guarantee that the state public utility commissioners will approve the rate increases necessary to raise the monies required. The significance of this point was highlighted in a letter from James Wilson of the National Association of Regulatory Utility Commissioners. Mr. Wilson noted that many states limit or totally forbid utilities to increase rates to reflect construction work in progress — a situation that certainly will characterize Clinch for some time. He went on to note that utility commissioners are already experiencing difficulty with raising rates to cover costs of plants cancelled because of excessive generation capacity and other cost factors. And noted in conclusion: "It would appear more appropriate for the federal government to finance the Clinch River Breeder Reactor in its entirety than to burden the electric utility industry with a portion of its cost." These statements do not create any confidence that we will obtain even the old private sector contribution — much less any new financing.

3. A NEW ENTITY, THE AMERICAN ENERGY DEVELOPMENT CORPORATION, WILL SELL "EQUITY SHARES" TO RAISE $150 MILLION:

This contribution again represents no new private sector investment, but instead represents the tax shelter value of the depreciation, accelerated depreciation, tax investment credits and research and development tax credits possible had Clinch been financed as a private activity. More simply put, "new" private funding is attracted by reducing "old" tax liabilities. A distinction that makes little difference to the rest of us who will continue to pay for Clinch.

Moreover, unlike the tax benefits that are offered in most tax shelter schemes, this plan requires the government to guarantee that the anticipated tax advantages will be allowed. It asks for: "assurances that all tax credits, deductions and other tax incentives related to the privately-financed portion of the project, will be available to the private investors as planned" and that if these tax incentives are not available, there should be sufficient government funds available for repayment to private investors. As many know, such guarantees are not customary in the private sector.

One final point: for DOE to enter the tax shelter game, at a time when efforts are being made elsewhere in government to clarify and rationalize the tax system seems particularly questionable.

4. "INTERIM FINANCING" LOANS OF $675 MILLION WILL BE FLOATED ON THE PRIVATE MARKET:

The plan envisions raising $675 million from "interim financing" loans that will in turn be refinanced in 1990 as long term bonds secured by the earning stream of the project. In effect, these long term bonds are revenue bonds secured by the sale of electricity expected to be produced from the Clinch River facility. In the original plan, the plant was totally owned by the government. Thus, this plan will attract "new" financing by giving away "old" assets.

But these assets are clearly not valued very highly by the private sector. Had they been valuable in their own right, Clinch would have been built by the private sector many years ago. Instead, the plan envisions a vast array of guarantees. These are no ordinary private-sector loans; the plan explicitly states that the federal government must guarantee the principle, tax benefits, and rate of return on the bonds. Further, if the long term financing arrangements don't materialize as anticipated or if the project fails to produce the quantity of electricity expected or if the electricity price is lower than projected . . . or if anything else happens, the taxpayer is made liable. The investors are provided an opportunity to purchase a risk free asset that happens to be labeled Clinch River -- the investor of course is purchasing the guarantee, not the Clinch project.

Not only is this policy destructive in its own right, it also threatens to undermine the incentives required for the project to have any chance of success. A complex technical project requires all involved to work to the peak of their abilities. The private sector creates important incentives that encourage that behavior. Individuals who succeed are rewarded; individuals who fail lose their investment. This plan eliminates all such incentives. Consider for example a situation in which Clinch is built and works but somewhat less efficiently than hoped. As a result, the plant breaks even -- but just. In that situation, the plan encourages the manager to stop trying, let the plant fail, and let government increase your earnings. A scheme better designed for failure is hard to imagine.

But no one should be surprised that private investors are reluctant to purchase Clinch River bonds based on any real anticipation that the bonds might be repaid from project revenues. A recent GAO report concluded that the CRBR was unlikely to pay for itself over its lifetime. An inadequate revenue stream provides little collateral to attract true private sector financing. In part, this problem stems from the factors cited earlier in the Rand comment: electricity is likely to be in over-supply in the period when the CRBR comes on stream. TVA has stated it anticipates little need for this generation capacity; and in the relevant region, five nuclear power plants have already been cancelled. The collapse of the Washington Public Power Supply System (WPPSS) should have taught us a lesson about the discipline reality can impose on even the most enlightened planners. The WPPSS mistake reflected reasonable expectations about future energy needs; if we proceed with this plan, we will be advancing on the basis of expected surplus capacity. It is folly and the antithesis of private sector wisdom to base any financing scheme on the anticipated sale of a product projected to be in oversupply.

In summary, this plan fails to address the concerns that motivated Congress to call for a new financing scheme. Congress wished a reduction -- not a rearrangement -- of the federal contribution to Clinch. This plan displays a distressing lack of candor. The special interests that want this project have spent and are spending a great deal of money — not to build the project — but to fool the public into approving taxpayer funding of the project. Expensive newspaper ads claim that this plan has "met the challenge." It has not. There is nothing here that was not here in March and even less than was here in April. Congress should admit that Clinch has failed the market test, and eliminate this project once and for all.

Mrs. **Lloyd**. Mr. Georgine?

Mr. **Georgine**. Thank you, Madam Chairman. Thank you, Madam Chairman, and members of the committee. I greatly appreciate this opportunity to talk with you today about the Clinch River breeder reactor project.

Both Mr. Alexander and Ms. Davidson will also have a brief statement after I have completed.

Before I get into the issue of Clinch River itself, let me take a moment to explain CJET. CJET is truly an unusual, indeed, unique coalition of labor, business, minorities, women, scientists, and professionals. Our membership includes 18 labor unions, the U.S. Chamber of Commerce, the General Federation of Women's Clubs, the National Conference of Black Mayors, the National Black Caucus of State Legislators, and the National Association of Manufacturers, and a range of other organizations representing all walks of life.

A coalition of this diversity is rare and the areas of disagreement can be many. But there are areas in which we do agree.

Mrs. **Lloyd**. I think you represent a lot of taxpayers.

Mr. **Georgine**. I think so, too. Thank you very much, Madam Chairman.

We do share some very basic and real concerns and have decided to work together to advocate the implementation of policies that we believe best address those areas of concern.

One primary area of concern, and of agreement, is energy. We all understand that without adequate, affordable energy supplies, our Nation cannot offer the degree of economic, social or political opportunity that all Americans deserve.

It's clear that real and substantive disagreement exists among the energy experts as to which energy sources and technologies will be available, at what cost, and in what amount.

But it's also clear that even at modest rates of growth, two percent or so a year, our need for electricity will double in less than 30 years. Because we are looking at a future which will require so much energy, particularly electricity, the prudent, responsible course of action is to develop promising, renewable energy technologies which can provide that electricity.

Clinch River represents one of those technologies. Over the last 30 years we have invested more than $5 billion and millions of man-hours in the development of breeder technology.

Since Clinch River was first conceived 12 years ago, we have invested another $1½ billion. By completing Clinch River now without delay, America will finally be demonstrating, on a large scale, the practical economical and environmental viability of a renewable energy technology.

Should we fail to complete Clinch River, we will be wasting not only the $1½ billion spent on that specific project, but also much of the $5 billion we have put into the breeder research over the years.

If we fail to complete Clinch River now, there could also be other implications; implications involving the need to buy the technology from overseas, thereby having a negative effect on American jobs and our balance of trade; implications that will result in the United States not being a part of the international breeder scene, either in the international marketplace or at the nonproliferation table.

Those are the real risks involved. They related to the adequate energy supplies and the guarantees of their availability; to the billions of dollars we have invested in developing a renewable energy technology; our national will to bring a long-term effort to fruition and to the international scene, from which we could be excluded.

In light of those risks, the Government's continued support for Clinch River is prudent, responsible, and appropriate. Of course, it is not only the Government that has made substantial investments in the technology.

The utility industry contribution to Clinch River, which will now reach around $325 million, remains the largest contribution ever made by the private sector to a government R&D effort.

And while there are some who have suggested that we follow the foreign example and require utilities to pay a greater share of the cost, I wonder if those same people would like to be the ones to go to the public utility industry commission and ask for permission to use ratepayers' moneys for this project?

Indeed, those who suggest that course of action are ignoring one of the great advantages of the alternative financing plan—this plan provided for raising $1 billion from the private sector without impacting anyone's utility rates.

Organized labor has made a substantial contribution to Clinch River as well. We signed, some months ago, a comprehensive agreement with management that, through unique shift arrangements, long-term wage agreements, and the removal of the threat of strikes or lockouts, will allow construction to proceed quickly. Under the agreement it is possible for work to proceed 10 hours a day, 7 days a week.

In short, the agreement will result in a savings of millions of dollars to the project.

Let me be very clear about this. There is no question but that organized labor could have gotten more for its members over the long run had we not signed this agreement. But we forewent those long-term gains as part of our real and unwavering commitment to this project. This is organized labor's contribution to Clinch River—and it is unprecedented.

Despite these significant efforts on the part of both labor and industry, there are those who still want more. They suggest that the cost of the project should be borne by industry. We disagree.

We think it is entirely unrealistic to expect private investors to risk large sums of money on a project that has experienced as many fits and starts as Clinch River, fits and starts imposed at the Federal level.

We think it is unrealistic to expect investors to risk large sums of money on a project that will be controlled, in its entirety, by the Federal Government.

Clinch River was begun as a Government project and should be completed as a Government project. The private funds that will be applied to its completion represent a rare case of the private sector assisting the Government in the completion of a Government project—a welcome and a laudable turn of events.

And why shouldn't it be a Government project? After all, the research and development of energy technologies is a national issue, an issue of economic importance, of national security importance, of justice and of opening the doors of opportunity for all Americans.

It is not, as some have suggested, an exercise that will only help industry. It's an effort that will help all Americans. And as such, it's an effort that all Americans should support.

Of course, to the extent that is practical and reasonable, private industry should be expected to share in the costs of efforts like this. We think the alternative finance plan represents such a practical and reasonable step. It is substantive, fair, and responsive.

The Committee on Jobs, Environment, and Technology represents a broad spectrum of the American population. The coalition represents literally millions of American taxpayers, ratepayers, and consumers.

We view Clinch River as one part of a real commitment to developing and demonstrating renewable energy technologies. Our interest is not a nuclear or nonnuclear future.

Our interest is an energy future of security; an energy future that will afford us the ability to provide abundant employment opportunities and a strong, growing economy.

To retreat now would represent a gamble with that future that we cannot afford. So we ask you to take a positive step. The alternative finance plan before you will allow Clinch River to be completed with a substantially lessened budgetary impact. It will enable us to determine the real viability of the technology.

That's the kind of progress we need. It is not enough to say that we think we can meet future energy demands. We must be able to say that we are doing everything we can to insure that those needs can be met.

The development of renewable energy technologies, such as that being demonstrated at Clinch River, will provide those assurances. And I think that this generation and those that follow deserve no less.

Thank you very much. Susan?

Mrs. LLOYD. Thank you, Mr. Georgine, for a very beautiful statement.

Ms. Davidson.

Ms. DAVIDSON. Madam Chairman, members of the committee: The General Federation of Women's Clubs, the largest and oldest nondenominational, nonpartisan, international service organization of volunteer women in the United States—we represent one-half million members in the United States and 10 million worldwide.

We submit today this testimony because of our strong support of the Clinch River breeder reactor.

Today, with the pressing problems of high unemployment, high deficits, and a struggling economy, our attention has been focused on immediate issues rather than a long-term energy policy.

But a long-term energy policy is vital. It will be impossible to sustain economic growth over a period of time without adequate supplies of energy.

The General Federation of Women's Clubs believes that a long-term—that the Clinch River breeder reactor project is a first step toward a long-term energy policy.

During the last decade, the United States has learned some important lessons about energy. We have learned that our entire Nation can be held hostage by foreign supplies of energy. We have discovered that insufficient or interrupted supplies of energy can directly alter our lifestyles, cost us jobs, and create a national panic.

Breeder reactor technology is the most promising of the emerging technologies. It will provide clean and abundant energy for decades to come. It is critical to pursue breeder technology now. Time is of the essence.

Even if we adhere to the present schedule, it will still be 10 to 20 years, into the next century, before the commercialization of the breeder is recognized.

There comes a time when a nation must set its research priorities. This is such a time. We must vote for the Clinch River breeder reactor project now.

Thank you.

Mrs. LLOYD. Thank you for your good statement.

[The statement of the General Federation of Women's Clubs follows:]

TESTIMONY OF JUANITA M. BRYANT, PRESIDENT
GENERAL FEDERATION OF WOMEN'S CLUBS

BEFORE THE

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION

HEARINGS ON

CLINCH RIVER BREEDER REACTOR

SEPTEMBER 15, 1983

MADAM CHAIRMAN, MEMBERS OF THE COMMITTEE. THE GENERAL FEDERATION OF WOMEN'S CLUBS IS THE LARGEST AND OLDEST NON-DENOMINATIONAL, NONPARTISAN, INTERNATIONAL SERVICE ORGANIZATION OF VOLUNTEER WOMEN IN THE WORLD, AND WAS CHARTERED BY THE UNITED STATES CONGRESS IN 1901. THE GENERAL FEDERATION OF WOMEN'S CLUBS REPRESENTS ONE-HALF MILLION MEMBERS IN THE UNITED STATES, 10 MILLION WORLDWIDE EMBRACING 52 STATE FEDERATIONS, INCLUDING THE DISTRICT OF COLUMBIA AND PUERTO RICO, EIGHT REGIONS, 421 DISTRICTS AND 11,000 CLUBS.

THE GENERAL FEDERATION OF WOMEN'S CLUBS SUBMITS THIS TESTIMONY TODAY, BECAUSE OF OUR STRONG SUPPORT OF THE CLINCH RIVER BREEDER REACTOR.

OUR MEMBERSHIP HAS VOTED UPON AND ADOPTED 23 RESOLUTIONS CONCERNING ENERGY AND ENVIRONMENTAL POLICY. ATTACHED IS A COPY OF OUR 1980 RESOLUTION ENTITLED "ENERGY CRISIS" WHICH READS IN PART:

> "RESOLVED, THAT THE UNITED STATES GOVERNMENT ENCOURAGE A COMPREHENSIVE NUCLEAR POWER PROGRAM WHICH WILL CONTRIBUTE TO OUR PRESENT ENERGY NEEDS AND REALISTICALLY PREPARE FOR THE LONGER TERM DEMAND."

TODAY,WITH THE PRESSING PROBLEMS OF HIGH UNEMPLOYMENT, HIGH DEFICITS AND A STRUGGLING ECONOMY,OUR ATTENTION HAS BEEN FOCUSED ON IMMEDIATE ISSUES RATHER THAN LONG-TERM ENERGY POLICY. BUT A LONG TERM ENERGY POLICY IS VITAL. IT WILL BE IMPOSSIBLE TO SUSTAIN ANY ECONOMIC GROWTH OVER A PERIOD OF TIME WITHOUT ADEQUATE SUPPLIES OF ENERGY. THE GENERAL FEDERATION OF WOMEN'S CLUBS BELIEVES

THAT THE CLINCH RIVER BREEDER REACTOR PROJECT IS THE FIRST STEP TOWARDS A LONG-TERM ENERGY POLICY.

DURING THE LAST DECADE THE UNITED STATES HAS LEARNED SOME IMPORTANT LESSONS ABOUT ENERGY. WE HAVE LEARNED THAT OUR ENTIRE NATION CAN BE HELD HOSTAGE BY FOREIGN SUPPLIES OF ENERGY. WE HAVE DISCOVERED THAT INSUFFICIENT OR INTERRUPTED SUPPLIES OF ENERGY CAN DIRECTLY ALTER OUR LIFESTYLES, COST US JOBS, AND CREATE A NATIONAL PANIC.

AMERICA IS CURRENTLY DEPENDENT UPON FOREIGN SOURCES OF OIL FOR 1/3 OF ITS SUPPLY. ALTHOUGH PROGRESS HAS BEEN MADE IN REDUCING U.S. DEPENDENCE ON FOREIGN SOURCES OF OIL, BY DECREASING ENERGY CONSUMPTION, STEPPING-UP DOMESTIC FUEL PRODUCTION AND INTENSIFYING THE DEVELOPMENT OF MORE EFFICIENT ENERGY TECHNOLOGIES, WE STILL REMAIN VULNERABLE TO SUPPLY DISRUPTIONS.

BREEDER REACTOR TECHNOLOGY IS THE MOST PROMISING OF THE EMERGING TECHNOLOGIES. IT WILL PROVIDE CLEAN AND ABUNDANT ENERGY AT LOW COSTS FOR DECADES TO COME. IT IS CRITICAL TO PURSUE BREEDER TECHNOLOGY NOW. TIME IS OF THE ESSENCE. EVEN IF WE ADHERE TO THE PRESENT SCHEDULE, IT WILL STILL BE 10 TO 20 YEARS INTO THE NEXT CENTURY BEFORE COMMERCIALIZATION OF THE BREEDER.

THERE COMES A TIME WHEN A NATION MUST SET ITS RESEARCH PRIORITIES. THIS IS SUCH A TIME. A VOTE AGAINST THE CLINCH RIVER BREEDER REACTOR PROJECT WILL PLUNGE THE U.S. INTO LAST PLACE AMONG THOSE NATIONS RESEARCHING BREEDER TECHNOLOGY.

THANK YOU.

14. Energy Crisis (Convention 1980)

WHEREAS, The most immediate short-term solution to the nation's energy problem is threefold:

1. Increasing domestic oil and gas;
2. Conserving energy;
3. Using alternatives to import oil wisely; and

WHEREAS, Inflation is considered one of the country's major problems and is not being adequately addressed; and

WHEREAS, Inflation will not be eased until the underlying energy and productivity problems have been cured; therefore

RESOLVED, That the General Federation of Women's Clubs recommends that the Federal government take steps to help accelerate domestic oil and gas production by elimination of the Department of Energy and to broaden the use of the coal resources in the United States; and further

RESOLVED, That Federal lease sales on the Outer Continental Shelf (OCS) in high potential areas such as the Bering Sea area should be offered earlier and more frequently than provided in the present 5-year lease schedule; and further

RESOLVED, That the use of the abundant coal reserve of the United States be encouraged and supported by the Federal government; and further

RESOLVED, That the United States government encourage a comprehensive nuclear power program which will contribute to our present energy needs and realistically prepare for the longer term demand.

Mrs. LLOYD. Mr. Alexander.

Mr. ALEXANDER. Madam Chairman and members of the committee: It is a pleasure to be here——

Mrs. LLOYD. Pardon me, Mr. Alexander. Without objection, you allow Mr. Alexander to continue his statement.

Mr. SMITH. Sure.

Mrs. LLOYD. Thank you.

Mr. ALEXANDER. Mayor Johnny Ford, president of the National Conference of Black Mayors, extends his apologies for not being able to join us today. He has asked me to make the following statement on the behalf of the National Conference of Black Mayors.

As one member organization of the Committee on Jobs, Environment and Technology, we strongly support the completion of the Clinch River breeder reactor.

Our support is based on several factors descending on one crucial point: the ability of poor Americans to achieve the level economic and social equality. They deserve largely related to availability and cost of energy. And as long as our Nation's energy future remains even a little bit uncertain, our responsibility to those who are still struggling, to do whatever we can to insure that the availability of energy is secure.

There are 232 black mayors in America today, representing over 20 million citizens. Most of the black mayors in this country are from small, depressed cities and towns. And as our organization, our charge is to look at, analyze, review a range of policies that may relate to more than the usual Federal, State, and local government relations.

We have studied and analyzed a range of issues that we believe would have an effect, positive or negative, on the ability of our communities to achieve its degree of economic security.

We have an energy task force which is today studying ways in which energy management in small municipalities can be improved. The task force has also taken an active role in discussing with and advising us on a number of energy issues.

In short, energy is an area in which we have a great deal of concern and interest.

When it comes to the fiscal issues, we are as sensitive as anyone else to the concerns that is this: As many of you know, we have opposed many budget cuts that have been made. That is what makes this financial plan now before you so attractive to us. It does, in fact, reduce the budgetary impact of the Clinch River project. And it does, in fact, provide more private participation in the project.

We are now faced with the question of terminating a project on which billions of dollars have already been spent, thereby wasting Federal funds.

We strongly support continuation of the project and we ask that this committee continue to do whatever is necessary to assure that this project continues.

Thank you.

Mrs. LLOYD. Thank you very much, Mr. Alexander.

In the interest of fairness, Ms. Lancelot, we will also allow—give you all 2 extra minutes if you would like to have them at this time.

Mr. SMITH. Just two points. Obviously, we are all concerned about the same goals of a secure energy future for America.

I think the question is whether that's a future is made more secure by adopting an uncertain high-cost road or rather going on the more proven road. That obviously translates into a higher consumer cost if we take the wrong road. We believe markets are better ways of insuring that consumers get the best deal; government really turns in the low-cost bid in any area I know about.

The—one question about the tax benefits we didn't quite follow up on is the issue was earlier raised of the—you know, is there any net effect on the Treasury? The billion dollars that are—of this new, so-called new money, either comes from things that were not being invested before and then there is an additional tax law. So it comes by shifting $1 billion as one of the people mentioned, was being used for homes for McDonald's, for small businesses in America, to this capital-intensive relatively low-job option—I think it certainly distorts the use of capital, of credit, in the United States. And almost certainly given the capital intensity of this project, reduces the overall employment opportunities for Americans.

I am quite shocked that labor representatives would feel that this is a pro job measure.

Ms. LANCELOT. I would just like to comment upon the money that has already been spent. I think that we all learned in Finance 101 that if one makes a bad investment, discovers that the investment is poor, that you don't continue to pour money into that investment. We, of course, feel that at this time Clinch is a bad investment and not to be continuously—should not continue to pour down a rat hole.

Mrs. LLOYD. Thank you.

Ms. Lancelot, is your taxpayers—I received a memorandum from you. I believe you have offices nearby. Is that correct?

Is—is this—this is new to me. Is this a registered lobbying organization?

Ms. LANCELOT. The National Taxpayers Union is——

Mrs. LLOYD. Call it Taxpayers Coalition.

Ms. LANCELOT. National Coalition Taxpayers Union is a registered——

Mrs. LLOYD. No; it's a Taxpayers Coalition that you represent, a registered lobbying organization.

Ms. LANCELOT. We are not a registered—the coalition itself is not a registered lobbying organization but the organizations that are part of the uh——

Mrs. LLOYD. No; it's the Taxpayers Coalition, is what I asked you.

Ms. LANCELOT. The coalition is not a registered lobby organization. However, other organizations are part of it.

Mrs. LLOYD. Do you—are you not required to register with the Clerk of the House under the regulation of the Lobbying Act?

Ms. LANCELOT. We are all—the people who are—the organization, the assisting organizations, were members of the organization—of the Taxpayers, of the Taxpayers Coalition, are all registered lobbyists.

The folks—the people who we all represent, different—16 different organizations. The National Taxpayers Union is a registered lobbying organization; Natural Resources Defense Council have lobbyists, and they are registered lobbyists; Council for Competitive Economy, Fred is a—they are 501C4; we are 501C4. I believe—I know that all of the organizations are registered lobbyists.

Mrs. LLOYD. Well, what is your view on Federal loans guaranteed for synfuel products and Federal tax credits for solar energy?

Ms. LANCELOT. We don't believe—the National Taxpayers Union itself does not believe in tax credits at all. We believe that there should be no subsidies to any form of energy, right across the board.

Mrs. LLOYD. You do not believe in tax credits for solar energy either?

Ms. LANCELOT. Never said——

Mrs. LLOYD. Or anything for solar energy?

Ms. LANCELOT. Uh-huh.

Mrs. LLOYD. Thank you very much.

Is this also your opinion, Mr. Smith?

Mr. SMITH. Yes; we don't want——

Mrs. LLOYD. You do not believe in solar or taxpayer——

Mr. SMITH. No. No. We believe that—no. We believe basically that a balanced energy program, nuclear energy and solar energy and other forms of power take their chances, and the one that wins will be the one that should win.

Mrs. LLOYD. Mr. Georgine, I want to commend you for your commitment and being here today and saying—I don't know another way to say it, but you really have gone the second mile on this. And I want to thank you for what you've done and for your leadership and for what you represent. And I want to join with you so that I feel that the economic stability and the national security of our country depends on having this source of energy. This is what we can count on for our future.

And I think that my colleague on the Senate—the Senate, Senator Baker, and I both said repeatedly that we sure wish this project were not in Tennessee because we don't like for people to think that we have parochial interests. But we have worked hard on it because we, like you, believe this is in—certainly in the interest of our country.

What is—what do you think? Do you think it's proper for the taxpayers to continue to bear the major risks that are inherent in building CRBR?

Mr. GEORGINE. Well, yes. You know, I think that the taxpayers pay for all of the expenses of Government. And I think that the research and the kind of technology that we're talking about is really a Government responsibility. And in that light, the answer to that question is yes.

Mrs. LLOYD. Well, do you—do you believe that it's clear that America will need breeder technology for their production of electricity?

Mr. GEORGINE. I—for us as construction workers—and I wear my building trades hat for the moment, if I may—whether we build a fossil-fueled powerplant or whether we build a hydroplant or whether we build a nuclear plant really doesn't make any difference, we get basically the same number of hours, manpower hours, on all of those kinds of plants. In fact, we get more on solar energy. We only would hope that that technology could be improved so that it could be built.

But we really believe that, in the short term, that nuclear is really the only option that we have facing us. We have abundance of coal. You can't mine it and, once you mine it, you can't transport it, and then once you transport it, you have difficulty burning it. So, we really do think that nuclear is our immediate future.

And to only get 30-percent efficiency out of the uranium, it just doesn't make any sense to us at all. And we think that, by the year 2000, we're going to need renewable sources of energy, and that the breeder is just the obvious answer. So, we really believe that, without it, this country will be in serious trouble.

Mrs. LLOYD. We thank you very much. I think my time is up.

As I stated earlier, about 9 o'clock this morning, I will have to leave to attend the funeral of my late colleague, Dr. Larry McDonald. At this time, I would like to ask Mr. Young if he would chair the remainder of the hearing.

I do want to thank all of you that have been here all day. It's been a long day, but it's been a good day. Thanks to all of you.

Mr. GEORGINE. Thank you, Madam Chairman.

Mr. SMITH. Thank you.

Mr. YOUNG [presiding]. Thank you. Thank you, Madam Chairman.

Just to finish up, Mr. Georgine, I think that you answered—I already answered a question about the wave of the future and the primary source of electric—electricity generation well into the next century.

But I've heard some figures on the Clinch River breeder reactor, this technology movement ahead on construction estimates of anywhere from 15,000 to 20,000. Is that anything at all in line with what you've heard, the amount of jobs created by this activity in the relatively future if we're able to move on ahead? The figure I heard was 15,000 to 20,000.

Mr. GEORGINE. 15,000 to 20,000 jobs overall; is that construction jobs and everything?

Mr. YOUNG. Overall.

Mr. GEORGINE. I think that that's a reasonable statement, yes.

Mr. YOUNG. In—is organized labor pretty much together? There is some division, I assume.

Mr. GEORGINE. Well, you see, there are some organized labor unions that oppose the continuation of the Clinch River breeder reactor. But the labor movement itself, the AFL-CIO, has a policy position on Clinch breeder. Lane Kirkland has just reiterated that policy in the last couple of months, and they very strongly are behind the continuation of the Clinch breeder.

Mr. YOUNG. Fine. Thank you very much, Mr. Georgine.

Mr. Brown.

Mr. BROWN. Mr. Georgine, I don't suppose you realize what a unique situation you're in here. You have two members of the committee who both belong to your organization. I've been an electrician for over 40 years, and you've been a plumber for how long?

Mr. YOUNG. Thirty years.

Mr. GEORGINE. That just goes to show that the voters in your district have shown good judgment.

Mr. BROWN. Mr. Georgine, I've been a supporter in the past of Clinch River and, for the 20-odd years I've been in Congress, I've supported nuclear breeders, fusion, all other balanced energy research programs of this Government.

I don't really want to get into an argument with you because I respect your position too much. And if I saw this as purely a jobs bill, I would be 100—or the project as being purely a jobs-creating project, I'd be 100 percent for it. But, unfortunately, I haven't been able to see it quite that way.

I think that the issue, as I see it, is one of timing and balance. And my original strong support for Clinch River was based upon the imminent need for this technology, not just the project, but for this technology, as you say, to meet our energy needs. I think changing circumstances have demonstrated that schedule is no longer necessary.

And I think that this administration has pursued Clinch River at the expense of other also useful energy research and development programs in other technologies, and has cut them to the bone.

Now, I want to ask you this: Do you think there's any chance you could get this great coalition that you organized to support a balanced energy research and development program?

Mr. GEORGINE. We—we're strongly in favor of a balanced research and development program, Congressman. We think that this country can't afford to put all its eggs in one basket. And we are very strongly behind that concept.

We may have some disagreement with regard to timing. I'm not so sure that I agree that the development of the Clinch breeder is no longer a viable technology.

Mr. **Brown**. No, I didn't say that. I just said that it is not as urgent to have this technology moved to the commercialization stage as rapidly as was originally contemplated. I agree with you we need the technology.

While you're working on this coalition, can you get them to agree to quit fighting the Davis-Bacon Act?

Mr. **Georgine**. I wish I could. The problem is that—you know, I was going to ask the chairman, and I will before we're completed, if I could add into the record six one-page statements, one of which is from the Chamber of Commerce. That's the first time I've ever done anything like that.

Mr. **Brown**. I wondered.

Mr. **Georgine**. I certainly would like to have the National Association of Manufacturers and the Chamber of Commerce supporting our position on Davis-Bacon. I think it's a laudable position.

Mr. **Brown**. I want to get that on the record that you're going to work on them with regard to that matter.

I appreciate your testimony. I think, very honestly, I have urged the kind of citizen interest in energy policy that you've demonstrated here for a number of years. I think it's very healthy. Obviously, we're not all going to agree, but I think we're going to have a sounder energy policy as a result of it. And I want to express my appreciation to you.

Mr. **Georgine**. Thank you, sir.

Mr. **Young**. We'd be happy to honor your request, Mr. Georgine, if you want to make a request of the committee.

Mr. **Georgine**. I would make that request, Mr. Chairman.

Mr. **Young**. Without objection, the statement will be entered as part of the record

[The information follows:]

SE2
SCIENTISTS
AND
ENGINEERS
FOR
SECURE
ENERGY, INC.

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Erich Isaac, Vice Chairman
Robert K. Adair, Vice Chairman
Miro M. Todorovich, Executive Director

NATIONAL OFFICE
Miro M. Todorovich
570 Seventh Avenue
Suite 1007
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WESTERN OFFICE
R. Leslie Dugan
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Harvard
Werner Wolf
Yale

*Member,
Steering Committee

Affiliations for
identification only

September 8, 1983

Honorable Ronald W. Reagan
The White House
Washington, DC 20500

Dear Mr. President:

On behalf of the more than fifteen hundred professional members of Scientists and Engineers for Secure Energy, I would like to commend you for your endorsement of the Clinch River Breeder Reactor Project.

We at SE$_2$ agree with you that completion of the Clinch River reactor is essential to the United States' continued role as a leader in technology.

SE$_2$ member Dixy Lee Ray has said "the [Clinch River] project will provide very valuable operating experience for our engineers; experience that will be extremely important in the future." We are at a juncture in our nation's history where we can ill afford to lose such a valuable training ground or the energy security which breeder technology will provide.

We again thank you for your support of this vital project and we invite you to call on us if the counsel and consensus of our members should prove helpful.

Sincerely,

Miro M. Todorovich ar

Miro M. Todorovich
Executive Director

cc: Dr. George Keyworth

1225 Nineteenth Street Northwest • Suite 415 • Washington, D.C. 20036 • (202) 223-5381

CHAMBER OF COMMERCE
OF THE
UNITED STATES OF AMERICA

RICHARD L. LESHER
PRESIDENT

1615 H STREET, N.W.
WASHINGTON, D.C. 20062
202/463-5300

September 12, 1983

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

On behalf of the U.S. Chamber of Commerce, I want to thank you for your personal commitment to help assure continued congressional support for the Clinch River Breeder Reactor Project (CRBRP).

The Chamber supports the orderly development and production of domestic energy resources and believes the completion of the CRBRP is essential to assure future economical supplies of electricity. Our members are willing to support investment now to assure this future.

The alternative CRBRP financing plan recently submitted to Congress by the Department of Energy, calling for one billion dollars from the private sector, is a further positive step toward realizing the goal. We are pleased it has your endorsement.

Because of our commitment to the development of this energy resource, and our concern for its outcome in the Congress, I consented to serve on the Advisory Committee of the Committee on Jobs, Environment and Technology. With your help, and that of members of your administration, the business community and the members of the Building and Construction Trades Department, AFL-CIO, I am hopeful that once again CRBRP will continue. I look forward to working with you to this end.

Sincerely,

Richard L. Lesher

Committee on Jobs, Environment and Technology

Robert Georgine
President, Building and Construction
Trades Department, AFL-CIO
Chairman

210 Seventh Street, S.E.
Suite 59
Washington, D.C. 20003
(202) 547-7036

Building & Construction Trades Department, AFL-CIO
National Association for the Advancement of Colored People
American Association of Engineering Societies
American Nuclear Energy Council
American Nuclear Society
American Public Power Association
Americans for Energy Independence
Atomic Industrial Forum, Inc.
Edison Electric Institute
General Federation of Women's Clubs
International Association of Bridge, Structural and Ornamental Iron Workers
International Association of Heat & Frost Insulators and Asbestos Workers
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers
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United Brotherhood of Carpenters & Joiners of America
United Union of Roofers, Waterproofers & Allied Workers
Utility Workers Union of America
Youth for Energy Independence

June 15, 1983

President Ronald Reagan
The White House
Washington, D.C. 20500

Dear Mr. President:

Over the last several years, citizen concern about energy has dwindled dangerously. Once an area of key concern, America's energy future is a matter rarely discussed and even more rarely understood.

Yet the fact remains that America faces a serious dilemma. Even if one assumes modest growth rates, the nation will need to double its electric energy supply by early in the next century. Nonetheless, no one really knows what energy sources we will be able to count on and at what cost.

That is why we formed the Committee on Jobs, Environment and Technology. As you can see, our membership is extremely broad, and includes business and labor, minorities and women, scientific and professional associations. While we disagree on many subjects, on this one we fully agree. We all recognize the pivotal role energy plays and we are all committed to seeing our nation achieve the prosperity, strength and vitality that has been so much a part of our history. Without adequate and affordable energy supplies, as you well know, none of that can be possible.

Along those lines, our first area of focus, because it represents a technology with virtually unlimited potential, is the Clinch River Breeder Reactor. Long the subject of debate, the fact remains that Clinch River is today our nation's only technological demonstration of an almost unlimited energy resource. Its design is 90% complete, 75% of the equipment is on site or on order and site preparation is underway--ahead of schedule and under budget.

President Reagan
June 15, 1983
Page 2

More importantly, the Department of Energy and the electric utility industry have, at the direction of the Congress, developed a new financing plan for the project that will help substantially to reduce Clinch River's strain on the federal budget. This plan, which will allow for a 40% reduction in actual budget expenditures and a corresponding investment of nearly $1 billion from the private sector, is an excellent example of the kind of private involvement you have spoken about so often. In fact, the remaining on-budget funding required by the plan is only slightly more than the nation spends every week for imported oil.

Clinch River will be responsible for more than 8,000 jobs. It will also help the United States retain a position as a world technological leader. But most importantly, it will provide the operating experience we need in order to tap the vast potential of breeder reactor technology--a potential that exceeds, three times over, all of OPEC's oil. In short, the Clinch River project represents the best traditions of American commitment to utilizing and developing new technologies to meet our needs and the needs of generations to come.

The cost-sharing plan described will need your full and active support if we are to be successful in completing this important project.

America's energy future is truly a matter of national and international importance. On this issue especially, the weight and influence of your good offices will be crucial.

I look forward to your support.

Sincerely,

Robert A. Georgine

Robert A. Georgine, Chairman
Committee on Jobs, Environment
and Technology

President, Building and Construction
Trades Department, AFL-CIO

RAG/dlr
opeiu#2afl-cio

Hill mailing
9/27/83

Edison Electric Institute
1111 19th Street, N.W.
Washington, D.C. 20036

American Nuclear Energy Council
410 First Street, S.E.
Washington, D.C. 20003

September 27, 1983

Dear Mr.

As the decisive vote on the Clinch River Breeder Reactor (CRBR) approaches, Members of Congress should be aware of the wide range of support for this critical research and development project. A unique coalition of labor, business, scientific, industry and public interest groups have strongly endorsed the completion of Clinch River. This impressive coalition is urging Congress to approve funding for the project based on the Administration's alternative financing plan, which includes a significant increase in private-sector funding.

Highlights from the enclosed package of endorsements:

> "Because of the Clinch River Breeder Reactor's importance to growth and employment and its direct effect on thousands of American workers, we believe that is imperative to go forward with completion of the project."
> - American Federation of Labor and Congress of Industrial Organizations, AFL-CIO

> "CRBR Project is an essential step toward ensuring the long-run adequacy of our nation's energy supplies and energy self-reliance."
> - Robert A. Georgine, President, Building and Construction Trades Department, AFL-CIO

> "The Chamber supports the orderly development and production of domestic energy resources and believes the completion of the Clinch River Breeder Reactor Project is essential to assure future economical supplies of electricity."
> - Richard Lesher, President, U.S. Chamber of Commerce

> "We strongly support the completion of the Clinch River Breeder Reactor ... Terminating Clinch River would, we believe, be a tragic error and a disservice to those in America who look to Congress for leadership, vision and hope."
> - Johnny Ford, President, National Conference of Black Mayors

> "The breeder is an inexhaustible energy source ... What is at stake is nothing less that a energy system that can serve for centuries, if not millenia."
> - Alvin Weinberg, Director, Institute for Energy Analysis

As a Member of Congress, you have the opportunity to assure the completion of a project crucial to America's energy security. We urge your support of the Clinch River project.

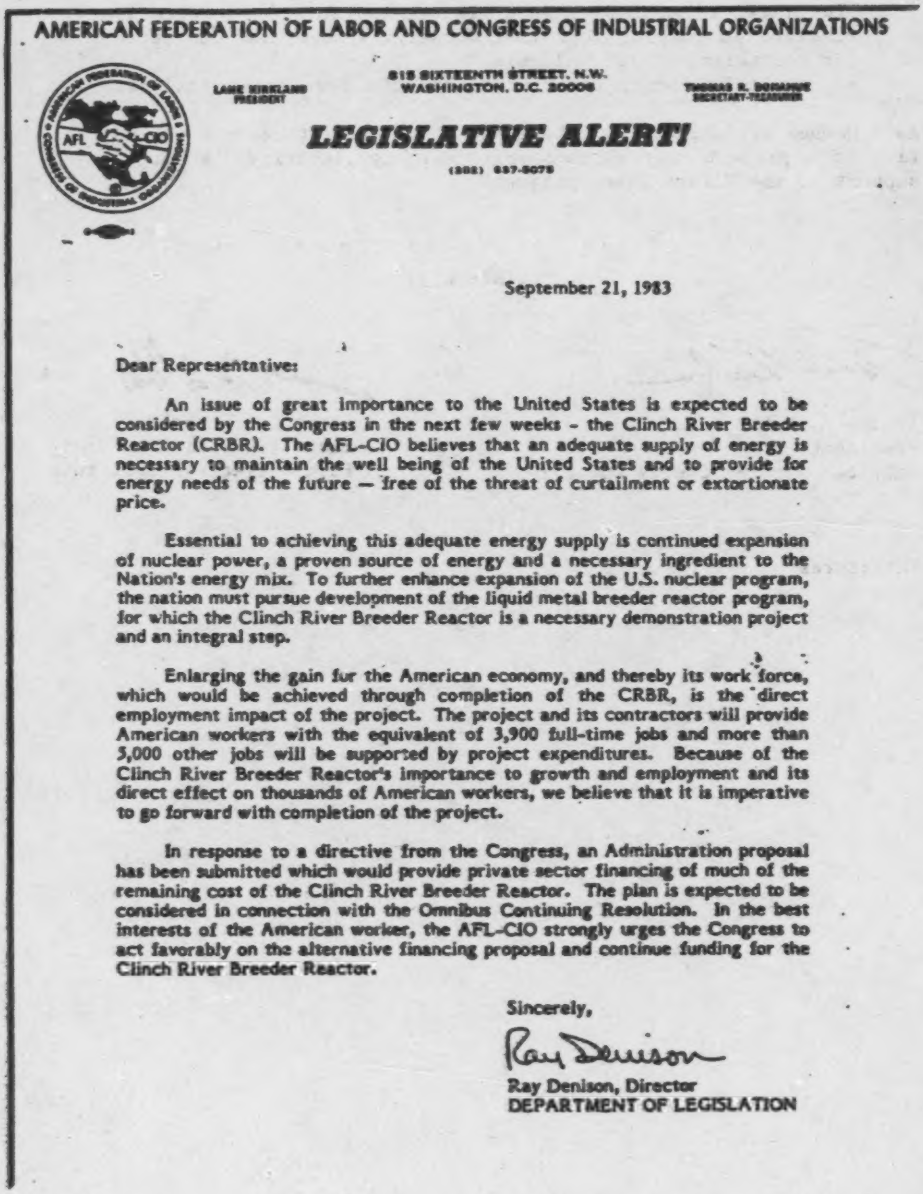
Sincerely,

Tom Kuhn

Thomas R. Kuhn
President
American Nuclear Energy Council

Frederick L. Webber
Executive Vice President
Edison Electric Institute

Enclosures



AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS

815 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20006

LANE KIRKLAND
PRESIDENT

THOMAS R. DONAHUE
SECRETARY-TREASURER

LEGISLATIVE ALERT!

(202) 637-5075

September 21, 1983

Dear Representative:

An issue of great importance to the United States is expected to be considered by the Congress in the next few weeks - the Clinch River Breeder Reactor (CRBR). The AFL-CIO believes that an adequate supply of energy is necessary to maintain the well being of the United States and to provide for energy needs of the future — free of the threat of curtailment or extortionate price.

Essential to achieving this adequate energy supply is continued expansion of nuclear power, a proven source of energy and a necessary ingredient to the Nation's energy mix. To further enhance expansion of the U.S. nuclear program, the nation must pursue development of the liquid metal breeder reactor program, for which the Clinch River Breeder Reactor is a necessary demonstration project and an integral step.

Enlarging the gain for the American economy, and thereby its work force, which would be achieved through completion of the CRBR, is the direct employment impact of the project. The project and its contractors will provide American workers with the equivalent of 3,900 full-time jobs and more than 5,000 other jobs will be supported by project expenditures. Because of the Clinch River Breeder Reactor's importance to growth and employment and its direct effect on thousands of American workers, we believe that it is imperative to go forward with completion of the project.

In response to a directive from the Congress, an Administration proposal has been submitted which would provide private sector financing of much of the remaining cost of the Clinch River Breeder Reactor. The plan is expected to be considered in connection with the Omnibus Continuing Resolution. In the best interests of the American worker, the AFL-CIO strongly urges the Congress to act favorably on the alternative financing proposal and continue funding for the Clinch River Breeder Reactor.

Sincerely,

Ray Denison

Ray Denison, Director
DEPARTMENT OF LEGISLATION

The American Society of Mechanical Engineers

Nuclear Engineering Division
(Founded in 1954)

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Please address reply to:
P.O. Box 415
Lancaster, OH 43130

September 12, 1983

President Ronald Reagan
The White House
1600 Pennsylvania Avenue
Washington, D.C. 20500

Dear President Reagan:

I want to take this opportunity to personally thank you for your past support of the Clinch River Breeder Reactor, and ask your continued support of this very important energy project.

Nuclear power and coal offer the only possibility for United States energy independence well into the twenty-first century. The Clinch River Breeder demonstration project is a vital part of this effort.

These statements reflect my own personal opinions developed over thirty years of work in the field of power generation.

I laud your understanding of the important energy issues facing this country.

Sincerely,

Burton Ziels

Burton D. Ziels

bf

Member • American Association of Engineering Societies • Accreditation Board for Engineering and Technology

Mr. **Young**. On behalf of the chairman and the rest of the committee, I would like to thank the panel for being so patient with the Congress this afternoon, with the backup—with the Secretary, and then all the way up to this afternoon. So we do appreciate very much your staying with us and your testimony, and would thank you very much for your appearance today. Thank you very much.

Mr. **Georgine**. Thank you, Mr. Chairman.

Mr. **Smith**. Thank you, sir.

Mr. **Young**. The next panel will be panel 4 with Dr. Yasinsky, general manager of Westinghouse Corp.; and Dr. Brian Chow.

If the two gentlemen would come forward, without objection, your formal statements will be made a part of the record, and you could summarize in whatever fashion you would like.

I would suggest—I notice, Dr. Yasinsky, you're the No. 1 here on the panel. So if you would like to proceed, unless you and Dr. Chow have worked out some other arrangements, it would be fine with the committee if you would like to proceed.

STATEMENTS OF JOHN B. YASINSKY, GENERAL MANAGER, ADVANCED POWER SYSTEMS DIVISIONS, WESTINGHOUSE CORP., AND BRIAN CHOW, PAN HEURISTICS

Mr. **Yasinsky**. Thank you very much, Mr. Chairman.

My name is John Yasinsky. I'm general manager of the Advanced Power Systems Divisions of Westinghouse. My company and I have been involved in the development of various nuclear and nonnuclear advanced energy technologies for a number of years.

I'm very pleased to have the opportunity to discuss the Clinch River breeder reactor project, an important step in demonstrating that breeder technology development in this country will provide an almost limitless supply of energy for this Nation.

Much has been discussed on a financing plan, and I won't touch on that. I do have a few other points I would like to make.

The General Accounting Office, in its report, the Liquid Metal Fast Breeder Reactor, Options for Deciding Future Pace and Direction, the International Nuclear Fuel Cycle Evaluation Study, and several other prominent national/international studies have made the same point.

And to quote from the GAO report:

> If the LMFBR is to be developed to the point where industry can use it, an intermediate-sized plant such as the Clinch River plant is a logical and prudent step to gain important operational experience. We can't simply stop that project today and believe someday we can have our own domestic commercial-sized breeder reactor technology.

Now, we've heard several times today that the Clinch River is an R&D project. It's not a commercial plant. It's a step toward the future commercialization. Several comments were made recently that the pace of the program has changed, that we don't need a breeder as early as we anticipated that we did need it several years ago. However, the pace of the program that we have in place today has also changed significantly from the program we had 5, 6, 8 years ago.

Now, the economic case for the breeder rests with its lower fuel cycle costs offsetting its somewhat higher capital costs to give it total power costs comparable to or lower than the light-water reactor. In addition, it's a conservation machine. It will produce electricity 60 times more efficiently than today's reactors.

Now evaluations based upon domestic and international experience have shown that a mature breeder with the benefits of replication can achieve a capital cost less than 35 percent above that of a light-water reactor and well within the allowable capital cost range for the breeder to be competitive in the marketplace. Clinch River can't match that. We're talking about the future.

Advanced U.S. breeder designs currently being evaluated now that are based upon successful Clinch River operation in additional plant technology development are projected to have capital costs very close to those future light-water reactor plants of comparable thermal output. These positive developments are based on the successful completion and operation of Clinch River—of the Clinch River demonstration plan and effective breeder research and development programs during the 1980's.

Now, it's been suggested by a number of breeder proponents on several occasions that the LMFBR will not be economic until the year 2050. I don't think any of us can predict the future 50 years—80 years from now. Now such estimates are based upon computer models where you input data, parametric studies assuming plentiful uranium resources and high projected capital costs for fuel fabrication, reprocessing, and the breeder plant itself.

Now when we run these programs, depending upon the input we put in, we get different answers. These studies that predict the year 2005 commercial entry for the breeder reactor basically take the maximum projected values considered anywhere, not only for the capital costs, but for the cost of fuel fabrication and the cost of spent fuel reprocessing and other associated waste processing costs.

Now all other extensive studies, both nationally and internationally, predict break even in the period 2000 to 10, 2000 to 20, which is a date that we foresee the possible commercial introduction of the breeder. We don't know yet. These studies provide guidance. They cannot be definitive and should not be used to make ultimate decisions at this point.

An important second point is that America cannot afford to be complacent regarding its energy policy. No one can predict accurately the timing and impact of the next international political upheaval that will strain our national security and highlight our energy vulnerability. While there's currently a plutonium—petroleum glut and our electrical reserve margins are large, one must realize that these conditions are, in part, the result of the steepest economic recession since the 1930's, and will fade once the economy continues.

We can't predict the future. We can do these analyses to give us an idea of where we're going.

In addition, these analyses consider the uranium that we're going to use here in this country in our plants. In the future, as the world continues to develop uranium, with the United States being only one of five countries with significant uranium resources, we can expect that the United States will be exporting uranium.

Also, earlier this morning, the question was raised that nuclear power and the breeder—in fact, electricity in general—cannot reduce our dependence upon imported oil, that we're only using 5 percent of 8 percent of our oil to produce electricity. That's only part of the problem, part of the solution.

The second side is electricity can and is being substituted for oil in end-use applications throughout industry. And recent analyses indicate that 75 percent of all oil used in industry can be reduced, can be replaced by electricity.

Now the status of the project has been reviewed several times today. I'd just like to add to that, that the project has achieved unparalled success in the licensing process. Hearings on all safety issues have been resolved and a construction permit is expected this fall. This will enable permanent facility construction to commence upon completion of site excavation that is currently nearing completion.

I would like to mention just a few other points. One, the Clinch River technology is not obsolete, and I provided testimony and data on this before this subcommittee on several other occasions.

Many of Clinch River's design innovations were developed through the U.S., LMFBR base program, including the work being done at the Hanford Engineering Development Lab. Congressman Morrison commented on the success of the Fast Flux Test Facility this morning and its positive relationship to improvements in Clinch River and breeder plants beyond.

Now there's nothing obsolete whatsoever about the Clinch River design or the overall U.S. breeder technology program. I think it's something we can stand up and be proud of.

Another important point is that the Clinch River project is well managed. Clinch River is one of the most thoroughly and frequently reviewed and audited projects in history, with over 425 independent Federal audits having confirmed the project's merits.

When we consider project management and performance, we also have to take a look at project cost control. The first realistic cost estimate of $1.74 billion was developed in 1974, after the first conceptual design was complete. Today's official plant cost estimate for Clinch River is solid. Only 30 percent of the increase can be attributed to internal causes, such as design improvements and refinements in cost estimates over the last 9 years. The balance of the cost increase resulted from events beyond the project's control. This has been substantiated by an Inspector General's audit.

In light of this, it's not surprising that allegations of unsatisfactory project management could not be substantiated. Quite the contrary is true. Based on those cost increases within the project's control, some $600 million, Clinch River's cost has increased an average of only 4 percent per year at a time when the inflation rate was well over 10 percent a year. Clinch River's management record also is one of which we can stand up and be proud.

Now, contrary to what many have said, termination of the Clinch River plant will not save money. This has been discussed before, that with termination costs, we can look for lost taxpayer money of approximately $1.9 billion. Abandoning Clinch River would be another step along the trend line that I think is very frightening. It is moving the United States further away from worldwide technological leadership, a trend that has already occurred in industry such as steel, automobiles, and electrical appliances. It is in the process of happening in areas such as heavy manufacturing, solid-state electronics, telecommunications and transportation technologies.

The question is whether or not we have the courage to stand up for a technology that this country will need in the future and make the tough decisions we have to make today to guarantee that we have that option, other than purchasing it from a foreign country.

Competion of Clinch River will cost as much as a couple weeks' worth of imported oil, and electricity will reduce our dependence upon imported oil. This is a small price to pay, not only to demonstrate that breeder technology can work in the U.S. utility framework, but to show other nations that America still is dedicated and has the ability to pursue and complete long-term high-technology commitments.

Thank you.

[The prepared statement of Mr. Yasinsky follows:]

STATEMENT OF DR. JOHN B. YASINSKY

WESTINGHOUSE ELECTRIC CORPORATION

BEFORE THE

U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON SCIENCE AND TECHNOLOGY

SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION

September 15, 1983

MADAM CHAIRMAN, and members of the Subcommittee,

I am John Yasinsky, General Manager of the Advanced Power Systems Divisions of Westinghouse Electric Corporation. Our company is involved in the development of various advanced nuclear and non-nuclear technnologies including the liquid metal fast breeder reactor. We play a lead role in support of the Department of Energy on the Clinch River Breeder Reactor and participate in follow on plant studies and the LMFBR Base Technology program. Through the Westinghouse Hanford Company we operate the Hanford Engineering Development Laboratory for the Department of Energy and, in that capacity we are also responsible for the operation of the Fast Flux Test Facility.

I am pleased to have this opportunity to discuss the Clinch River Breeder Reactor Project , a project I have been involved with since 1974. At Westinghouse we share the belief of much of the scientific and technical community that the completion of Clinch River is an important step in demonstrating that breeder technology developed in this country will provide an almost limitless supply of energy for this nation's central power generation plants.

The role of Clinch River in the international breeder research and development programs of the world is being addressed by others here today. I would like to point out that every industrialized nation that is undertaking breeder technology has, in the course of their development effort, built a plant comparable in size to Clinch River. Some nations are moving ahead more quickly than the United

States, others are moving more slowly, but all of them want to have the option available when it is needed. The same is true of this country. Present plans call for the completion of Clinch River by 1990. This would provide operating data for several years to be compared with other nation's research, development and demonstration results so that we are in a position to build and operate a commercial breeder by the time it may be needed.

The first commercial breeder plant will probably not be operating until at least a decade into the next century. By then a better understanding of uranium availability and cost and nuclear power growth will have been obtained. That data will be key in the decision as to when we move forward with commercial breeder power plants in this country.

The International Nuclear Fuel Cycle Evaluation study, and many other national and international studies came to the same conclusion as the GAO did in their report entitled "The liquid Metal Fast Breeder Reactor - Options for Deciding Future Pace and Direction". In this report the GAO restated advice it has offered Congress several times in the last 7 years. They advised,"...if the LMFBR is to be developed to the point where industry can use it, an intermediate -sized plant such as the Clinch River project is a logical and prudent step to gain important operational experience on breeder reactor performance, reliability, maintainability, safety, environmental acceptability, licensability, and economic feasibility." Clinch River is the right plant at the right time.

LMFBR ECONOMICS

The economic case for the LMFBR rests on its lower fuel cycle costs offsetting its somewhat higher capital costs to give a total power cost comparable to or lower than the LWR. Data on the price to which uranium has to increase for break-even has been published in the U.S. Non-Proliferation Assessment Program and in the extensive 66 nation International Fuel Cycle Evaluation program. These assessments showed that the allowable capital cost for the LMFBR ranges up to twice that of the LWR.

Evaluations based upon domestic and international experience show that a mature LMFBR with the benefits of replication can achieve a capital cost less than 35% above that of an LWR, and well within the allowable capital cost range for the LMFBR to be competitive in the marketplace.

Advanced U.S. LMFBR designs, based upon successful CRBR operation and additional plant technology development, are projected to have capital costs very close to those of future light water reactor plants of comparable thermal output, rather than the 35% higher capital costs for mature commercial LMFBR plants based on current designs.

These positive developments are based on the completion and operation of the Clinch River demonstration plant and effective LMFBR research and development programs during the 1980's to proof test design features beyond the current state-of-the-art. The successful construction and operation of Clinch River will also identify further design improvements and cost reductions. In addition, the operating experience to be gained from Clinch River during the 1990's is essential to establishing the utility confidence needed for private sector financing of future large LMFBR plants based upon advanced designs.

Completion and operation of the Clinch River project is an essential step in progress twoards economic LMFBRs.

It has been suggested for example by Dr. Chow that the LMFBR will not be economic until 2050. Such estimates are based on parametric studies assuming plentiful uranium resources and high projected capital costs for the LMFBR. It must be noted that:

firstly -

All the extensive studies both nationally and internationally predict breakeven in the period 2000-2020 which as I have emphasized is the date that we foresee for commercial introduction of the breeder.

secondly -

An important second point is that America cannot afford to be complacent regarding its energy policy. No one can predict accurately the timing and impact of the next international political upheaval that will strain our national security and highlight our energy vulnerability. While there is currently a petroleum glut and our electric reserve margins are large, one must realise that these conditions are, in part, the result of the steepest econommic recession since the 1930's and are likely to fade once the economy recovers.

CLINCH RIVER PROGRESS

After passage of the Budget Reconciliation Act in August of 1981, which called for completion of CRBR as expeditiously as possible, the project has achieved dramatic progress. Indeed, the only factor now limiting expeditious completion is the availability of funding and the financing plan provides a clear, viable mechanism for removing this uncertainty.

Design is 92% complete, research and development is 98% complete, and $758 million worth of the hardware is complete or on order. Fifty percent of the hardware cost has already been incurred, all major long lead procurements have been made with most under firm, fixed-price contracts; the remaining procurements are essentially off-the-shelf items. Project construction will be undertaken pursuant to a Nuclear Stabilization Agreement with the building trades. The advanced stage of project development and planning affords high confidence that the cost estimates are valid, and that the schedular uncertainty (given sufficient future finding) is reduced to the barest minimum.

The project has achieved unparalleled success in the licensing process and in related actions in the federal courts. In September of last year, the Commission authorized site clearing and excavation, and that work will be completed by November of 1983. The Limited Work Authorization was issued in May, 1983. Hearings on all safety issues have been resolved and a construction permit is expected this fall. This will enable permanent facility construction to commence upon completion of site excavation.

In the past two years and despite all odds against it, the project has met or exceeded its highest expectations for progress in regard to every factor within its direct, and even indirect, control. The major remaining factor which will extend the schedule or increase the cost is insufficient funding.

The project's present favorable prospects for rapid completion are all the more impressive when it is recognized that this progress has been made during a time when lead times for conventional light water reactors have expanded up to fourteen years, and the NRC licensing process and the judicial system have combined to create an impenetrable morass for conventional reactor plants. The project's impressive record of progress warrants funding commensurate with expeditious completion.

I would like to summarize our position on several key points. First, the Clinch River technology is the most advanced in the world. Many of you have heard opponents claim that the Clinch River Breeder Reactor is technologically obsolete. These allegations have never been substantiated. Rather, Clinch River has proven to be as technologically advanced as any other breeder design in the world today.

That Clinch River is a loop rather than a pool design is one of the most often cited reasons for questioning the plant's technical adequacy. Contrary to critics' allegations, the pool design is not more advanced nor are there any indications that it is better. The pool concept was pioneered in the U.S. Our

Experimental Breeder Reactor II is a pool reactor. Interestingly, there is a significant amount of commonality between the pool and loop. Approximately 80 to 85 percent of the systems are common to both. Selecting the loop approach for Clinch River does not preclude using the pool on subsequent reactors. Both the loop and pool designs have excellent and equal probability of eventual commercial success. And both designs are being pursued by other nations.

The Clinch River design is based upon three decades of the world's most intensive base technology program and incorporates more than 1000 of the latest technology advances. A list of the 23 major design features that most impact cost and performance and a comparison with foreign breeders has been submitted previously to this committee. This comparison shows that all of the foreign breeders have some of these important features, but only Clinch River has them all. The bottom line is that, from the point of view of technology adequacy, Clinch River is at least as advanced and in many areas, is more advanced than other breeder reactors around the world.

Many of Clinch River's design innovations were developed through the U.S. LMFBR Base Technology program which has existed at the Hanford Engineering Development Laboratory for several decades. The work at Hanford has provided a focus for the base technology program. This program has culminated with the construction and operation of the Fast Flux Test Facility, the most advanced test facility of its kind in the world. The FFTF was built to test fuels, materials and components, and to provide experience with engineered LMFBR systems. FFTF, dedicated in April of 1982 is more than half way through its third 100-day operating cycle. During the first 100-day operating cycle, FFTF maintained full power for 53 consecutive days, a U.S. record for sodium-cooled reactors, which has already been broken during the current operating cycle which ends next month.

Clinch River's design is based on over 30 years of U.S. LMFBR experience, as well as incorporating the best features from breeder plants throughout the world. There is nothing obsolete about the Clinch River design, or the overall U.S. breeder technology program.

A second important point is that the Clinch River is well managed. Clinch River is governed by a project management system, developed and proven effective by the U.S. Air Force, which divides the project into thousands of work packages and milestones so that each can be closely monitored. It is one of the most thoroughly and frequently reviewed and audited projects in history. The DOE Inspector General's office has conducted 13 audits, one inspection and four investigations. And some 425 other independent federal audits have also confirmed the project's merits.

When considering the cost of the Clinch River plant, it is also necessary to look at the project management performance since the project was authorized in 1972. Although an initial budgetary estimate of $699 million was established at that time, the first realistic cost estimate of $1.74 billion was developed in 1974, following selection of project contractors and completion of plant conceptual design.

In a July 12, 1982, report, the Inspector General's Office substantiated this $1.74 billion figure as the first realistic cost estimate, and states that cost escalations must be measured against this figure.

Today's official plant cost estimate for Clinch River is solid. Only 30% of the increase can be attributed to "internal" causes such as design improvements and refinements in cost estimates over the last nine years. The balance of the cost increase resulted from events beyond the project's control. The Inspector General's audit found that nearly $1.3 billion of the escalated cost for Clinch River has been due to the "national policy debate," culminating in the 1977 order by the Carter Administration to indefinitely delay the project. And $160 million is attributed to ratcheting plant licensing requirements.

In light of this, it is not surprising that allegations of project management could not be substantiated. Quite the contrary is true. Based on those cost increases within the project's control (some $600 million), Clinch River's cost has increased an average of only 4 percent per year, at a time when the inflation rate was over 10 percent per year. When considering that current power plant construction projects are averaging annual cost increases of between 15 and 20 percent per year, Clinch River's management record is one of which we can be proud.

Contrary to what many have said, termination of the Clinch River project will not necessarily save money. The combination of the $1.6 billion already spent and the closeout costs of some

$300-million will result in a taxpayer cost of $1.9 billion with nothing to show for it.

The efforts of thousands over the past ten years which have resulted in a breeder design more advanced than any in the world, in millions of dollars worth of fabricated equipment, in a highly trained team of technical experts, and in a project system which should serve as a model for future government/private sector cooperative efforts will have accomplished nothing if the project is terminated.

Abandoning Clinch River would be another step along a trend line that I think is very frightening that is moving the U.S. further away from worldwide technological leadership--a trend that has already occurred in industries such as steel, automobiles and electrical appliances, and is in the process of happening in areas such as heavy manufacturing, solid state electronics and telecommunications.

The energy research, development and demonstration of the fast breeder reactor, which has been chartered and supported under the auspice of Congres for more than thrity years, has proven to be a success to date.

The successes of the breeder, both politically and technologically, are evident. Throughout the world today representatives of industry are bringing to the leaders of government the proof by way of hard data that the breeder is capable and ready to meet the global energy needs of the twenty-first century and beyond. The cornerstone upon which the U.S. breeder potential rests was laid more than 37 years ago with the inception of electrical nuclear power. It is essential for us to have a balanced national energy program if we, both government and industry, are to remain accountable within our global community.

Completion of Clinch River will cost as much as a couple of weeks' worth of imported oil. This is a small price to pay not only to demonstrate that breeder technology can work in the U.S. utility framework, but to show other nations that America is dedicated to developing technologies whose ultimate benefits will reach far beyond our own borders.

Thank you.

Dr. John B. Yasinsky

Westinghouse Electric Corporation

Dr. John B. Yasinsky is General Manager of the Advanced Power Systems Divisions of the Westinghouse Electric Corporation. Joining the corporation in 1963, Dr. Yasinsky was assigned to the Bettis Atomic Power Laboratory, working in reactor theory, design, dynamics and control in support of the naval nuclear program. In 1971 he was named manager of electric systems and plant analysis at Bettis.

The following year John was named to the White House Fellows Program and served as Special Assistant to the U.S. Secretary of Commerce.

Returning to Westinghouse, Dr. Yasinsky was named Manager, Business Development for the Breeder Reactor Divisions, moving through a variety of marketing management jobs. In 1978 he was appointed Director of the Advanced Coal Conversion Department which was responsible to the firm's activities in low and medium BTU coal gasification research and development.

Appointed President of Westinghouse Hanford Company in January 1979 he was responsible for the operation of the Hanford Engineering Development Laboratory for the U.S. Department of Energy. A major responsibility there is also the operation of the Fast Flux Test Facility for testing breeder fuels and materials. Work is also underway on developing and testing materials for fusion reactors.

He was appointed to his present position in August of 1980. In this post he is responsible for the Advanced Reactors Division, the Westinghouse Hanford Company and the Advanced Energy Systems Division.

Dr. Yasinsky received his B.S. in physics from Wheeling College. He earned a master of science degree in physics from the University of Pittsburgh and his Ph.D. in nuclear science from Carnegie Institute of Technology (now Carnegie-Mellon University). He has authored numerous technical papers and reports and taught in the graduate programs at Pittsburgh and Carnegie-Mellon.

Dr. Yasinsky is a member of the American Nuclear Society, the National Security Industrial Association and has served on the Advisory Council of the National Energy Resources Organization. He is a member of the White House Fellows Association.

Mr. YOUNG. Thank you very much, Dr. Yasinsky. Thank you very much, sir.

Dr. Chow, would you like to proceed?

Mr. CHOW. Yes.

Mr. Young, it is my pleasure to be here, although—can you hear me?

It's my pleasure to be here today, but certainly not as the last witness.

Before I comment on the alternative financing plan, I would like to say a few words about the Clinch River project itself.

In the last 10 years, I have been urging the Congress not to fund the project. We should remember that Clinch is not a research and development project, but a demonstrator of a specific design. Why do we need to demonstrate this particular design? It is because we already know that even a mature breeder, based on this design, is highly unlikely to be economical for some 70 years.

Now Dr. Yasinsky thinks that the conclusion is based on my own set of assumptions. This is not true. In fact, you can arrive at the same conclusion by using not my breeder cost estimates, not my uranium price projection, but those of the Department of Energy's own Energy Information Administration and the Oak Ridge National Laboratory, as I describe in my prepared testimony.

Therefore, no matter how up to date and advanced the Clinch design is, the design is still not good enough to make breeder economically competitive. And it's premature to demonstrate it some 30 to 50 years ahead of schedule. Besides, the Clinch design will be obsolete by the time we need the breeders.

Therefore, giving a choice between the breeder base program and Clinch, I agree with Secretary Hodel when he said in June in an interview that we need to continue the base breeder program, but we may not want a demonstration program. We need to support the base program in order to develop an economical breeder. Clinch breeder cannot test potentially economical designs.

Also, the insurance argument has been brought up, but I don't think I have time to go into it. I remember last year there was a debate by Heritage Foundation, and I spent quite a bit of time on it.

But, like Mr. Brown said, you know, the insurance is to how you buy it and what is the best way to insure the future. All I would say is improving the LWR would be a better insurance policy, because I try to use the highest DOE's nuclear projection that, if we improve the LWR, we will have enough uranium to support us until 2050. And that certainly is better because LWR improvement is economic and the breeder is not.

Now in regard to the proposed alternative financing plan, the most striking feature is that Clinch will end up costing the taxpayers more, even if the proposed plan works in the manner prescribed by the task force.

Now, how is this so? The bond issue of $1.04 billion is simply a guaranteed loan from the private investors. And since the cost of private borrowing, even with guarantee, is always higher than the Federal borrowing. The taxpayers must have to pay more. The funds of $175 million are already part of the original plans, so we do not need a new plan in order to receive such funds from the utilities.

As to the new equity participation of $150 million, it is the only element which any way resembles new risk capital from the private sector.

Let me take a digression here, because we are quite concerned about the tax shelter, and quite a few of you asked whether that tax shelter is a typical one and is available for any other private project. But I don't think that's quite a relevant question.

The relevant question is, we are comparing the existing plan versus the alternative financing plan. It is a fact. Under the existing plan, we—our costs of borrowing, which will be the Treasury bond, we do not need to pay for this tax benefit. So, in a sense, it will cost more to the taxpayer on that basis.

Now the task force claimed that their financing plan will significantly reduce total Federal budget outlays at a time when budget requirements are of critical importance and hosts a prospect of net future gain to the Treasury. It is clearly responsive to that 1982 congressional mandate. Moving outlays off budget, holding the prospect of a future gain which is equally available under the existing plan, ignoring the original cost-sharing arrangement, and offering, at best, an additional $150 million in new equity or 6 percent of the remaining funds required for the completion of the project, can hardly be considered as responsive to the intent of the congressional mandate.

Now this is particular so when the private cost share is only 12 percent of the total project cost. This is a far cry from the original cost-sharing arrangement which, at first, had the industry paying for most of the project. And when it was finalized in 1973, had industry paying 40 percent of the cost without getting any equity share in their plant.

But worse yet, a closer look at the reviews that equity investment will be supported largely by tax incentives. Actually, we don't quite have to worry about how much the tax incentive would be. It is a commonsense, if there's an equity financing, the equity investors would expect an expected return. And everybody knows an equity return would be higher than the cost of public borrowing.

So if you look at every component of the plan, the cost of that every component is higher than the public borrowing under the existing plan. So it is obvious that the alternative financing plan will cost the taxpayers more. So I don't understand when the Treasury Department says it would cost the same. It just simply cannot be, for the very fundamental fact that private borrowing costs more than public borrowing.

Now, last December, the Congress asked for a new plan under which the taxpayers will pay less and the private sector will pay more after spending about half to a million dollars. The task force is, in effect, telling us that this is not feasible. We can now see how unattractive the Clinch project is as an investment. In fact, interestingly enough, I think, they are being very modest to say that, under the alternative financing plan, they have only contributed 40 percent of the fund. Because using that peculiar logic, I think they can equally well say they have contributed 100 percent of the fund. As we know, the remaining fund of 1.5 will come from the Government, and that will increase the deficit, and the deficit will have to be financed by Treasury bond. And who buys the Treasury bond? Private investors. So what's the difference of private investors buying Treasury bonds versus private investors buying bonds issued suggested by the task force.

So, in that sense, they can equally argue the—the alternative financing plan, or the existing plan, 100 percent of the fund is provided by the private sector. Of course, that is absurd. So is the 40 percent that they claim is also very absurd.

Let me make one comment about the remarkable resemblance between the—this joint venture and WPPSS. Now both are off-budget entities intended to take the construction of nuclear powerplants into their own hands. Both designers envisioned the need of their nuclear projects in the early 1970's at the peak of nuclear power optimism. Both entities rely on guarantees from public utilities and/or governments in selling the bonds, and overestimated electricity revenues in paying their debts.

Both have incurred schedule delays and cost overruns on their plants. Both are supported by leading investment banking firms. Why not, in the fall of 1981, Merrill Lynch underwrote an additional $750 million in WPPSS bonds and earned a $22.5 million in commission. In their own estimation, the sale may well have been the most profitable in their history.

Now the differences between the two off-budget entities are that the WPPSS has a 478-percent increase in electric waste during the last 2 years, that it has created the largest municipal default in U.S. history, that it has attracted an ever-growing number of losses against near every involved party, and that it is likely to cause an increase in the borrowing cost for the municipalities and the State and also the electric utilities.

The only good news is that we do not have to create another monster.

So, in sum, we should support the alternative financing plan because it will increase the cost and risk to the taxpayer of an already highly questionable project. It opens the door to a WPPSS disaster at the Federal level.

Thank you.

[The prepared statement of Mr. Chow follows:]

OFF-BUDGET FINANCING FOR CLINCH RIVER: HIGHER COSTS AND RISKS

Brian G. Chow*

September 15, 1983

An invited testimony presented at a hearing before the
Subcommittee on Energy Research and Production,
Committee on Science and Technology
of the
U.S. House of Representatives

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BACKGROUND

In the last several years, there has been a growing recognition in the Congress of the dubious economics of the Clinch River Breeder Reactor (CRBR) project. For the first time, its annual appropriation was defeated in the House last year. In the Senate, even with strong lobbying by the Majority Leader Howard Baker, Jr. (it is in his state that CRBR is to be built), the funding survived by only one vote. However, both Houses agreed that the private sector should share more of the cost. So, last December, the Congress authorized $1 million to the Department of Energy (DOE) to

> "vigorously explore proposals, including a reconsideration of the original cost-sharing arrangement, that would reduce Federal budget requirements for the Clinch River Project or project alternative, and secure greater participation from the private sector."

In the Second Report of the Breeder Reactor Corporation (BRC) Task Force on which the final version of the proposed plan is based, the clause "including a reconsideration of the original cost-sharing arrangement" is deleted by a conveniently place ellipsis. This is hardly accidental considering that the original arrangement is not discussed in the report and that the proposed new plan bears no resemblance to the original one. I will compare the two plans later.

DOE's approach in designin[illegible] financing alternative is to develop government technical input to a task force organized in January by the Breeder Reactor Corporation. On March 12, the task force submitted to DOE its general outline for such a cost-sharing plan. However, the comments by the General Accounting Office were unfavorable. It observed that

> "while the proposal will probably change many of the existing project arrangements, the Federal government still appears to retain most risks if the project fails or if cost overruns occur."

The Congressional reception was equally cool. In fact, a bill to enact the proposal was drafted by DOE in late April and almost introduced in May. It was stopped only after objections by the breeder's own supporters, Congressmen Bevill and Fuqua, on the ground that it failed to reduce the project cost to the government.

The House, on June 7, and the Senate, on June 22, passed the Energy and Water Development Appropriation Bill, 1984, without funds for CRBR because of the absence of a "viable and substantive alternative" financing plan.

On June 23, the task force submitted a second report to Secretary of Energy, Donald Hodel. They claimed that they have developed

> "a specific plan for raising one billion dollars of private funds (the maximum available) to cover 40% of the estimated remaining costs to complete the Clinch River Breeder Reactor (CRBR) Project."

On August 1, Secretary Hodel formally submitted the plan to the Congress for consideration and action.

The key components of the plan are as follows:

Proceeds of 30-year, 10% bond issued in 1990 ($1040 million net of interest during construction $365 million)	$675 million	
New equity participations	$150 million	
Funds already committed by utilities and others	$175 million	
TOTAL PRIVATE FUNDS AVAILABLE		$1000 million
ONE-TIME MULTI-YEAR CONGRESSIONAL APPROPRIATION		$1500 million

REMAINING COST TO COMPLETE CRBR PLUS $100 MILLION START-UP COSTS	$2500 million

Moreover, the plan is filled with federal guarantees:

1. "Assurances as to completion, licensability and operability."
2. "Assurances that all debt secure obligations of the Project as well as its obligations to equity investors will be met under any and all circumstances."
3. "Assurances that all tax credits, deductions and other tax incentives, related to the privately-financed portion of the Project, will be available to the private investors as planned."
4. "Assurances against liability for replacement power costs and all uninsurable tort liabilities, resulting from the CRBR project."

WHAT IF THE PLAN WORKS?

In order for the plan to work as envisioned, the task force expects little cost overrun, little construction delay, a capacity factor comparable to that of a matured light-water reactor, an availability of plutonium fuel and fuel cycle services at BRC's projected costs, and excess electricity demand in the Southeastern region where many already partially completed nuclear power plants have recently been cancelled due to downward revision of future electricity demand. This is quite a tall order. However, the most striking aspect of the plan is that the taxpayers are made worse off even if it works in the manner prescribed by the BRC task force.

How is it so? The bond issue of $1040 million ($675 million plus interest of $365 million) is simply a guaranteed loan from the private investors. Since the cost of private borrowing is always higher than that of federal borrowing, the taxpayers would have to pay more. In truth, the task force strives to reduce the risk of the loan by stipulating all sorts of government guarantees and assurances. But in the eyes of private investors, the bond would not be as safe and clean as the treasury securities, and they would demand a higher interest rate. A recent example is the government guarantee plan of Chrysler Corporation's notes. Three notes due to mature in 1990 and totaling $1.2 billion were issued in June and July of 1980, and February of 1981, respectively. Although they are guaranteed by the U.S. Government for both principle and interest, their interest rates are higher than the rates of U.S. treasury securities of almost identical issue and maturity dates by .6 to 1.7 percentage points, or a weighted average of 1.1 percentage point. This increases the cost of borrowing by 10 percent. One cannot determine precisely the extra cost to the taxpayers as a result of the privately financed bond of $1040 million and the associated interim borrowings, until they are actually issued. The extra cost would depend on project risk, guarantee provisions, debt maturity and credit market conditions. However, it is certain that the cost to the taxpayers will be higher under the proposed plan than under the existing plan, and this is before including the fees and commissions in floating the notes and bonds.

With the bond issue being a guaranteed loan, how about the rest of the private funds? The funds of $175 million are part of the original pledge of $257 million plus interest. We do not need a new plan in order to receive such funds from the utilities. As to the new equity participation of $150 million, it is the only element which anywhere resembles new risk capital from the private sector. The task force claimed that their

> "financing plan will significantly reduce total Federal budgetary outlays at a time when budget requirements are of critical importance, and holds the prospect of net future gain to the Treasury, it is clearly responsive to the 1982 Congressional mandate."

Moving outlays off-budget, holding the prospect of a future gain which is equally available under the existing plan, ignoring the original cost-sharing arrangement and offering at best an additional $150 million in new equity or 6 percent of the remaining funds required for the completion of the project can hardly be considered as responsive to the intent of the Congressional mandate. This is particularly so when the private cost share is only 12 percent of the total project cost.* This is a far cry from the original cost-sharing arrangement which at first had industry paying for most of the project and that was finalized in 1973, with industry paying 40 percent of the cost without getting any equity share in the plant.** It is inconceivable to imagine that the Congress only wants an alternative financing plan in which the private sector shares little additional risks and costs of CRBR, but somehow the project's real risks and costs are better concealed to the uninformed by moving a signficant portion of the CRBR construction outlays off the federal budget.

Worse yet, a closer look reveals that "the equity investment will be supported largely by tax incentives, rather than by Project revenues" and that "these incentives would be measured by the entire private investment." In other words, the task force expects that the tax benefits would be based on the total private investment of $825 million ($1 billion minus $175 million remaining contribution) instead of the $150 million of equity.* Therefore, it is likely that the tax benefits will well exceed $150 million and that there will be no out-of-pocket capital outlay for the equity participations. Finally, even the task force admits that the total costs of CRBR to the government under the proposed plan will be higher than those under the existing plan. They state that

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* The total private cost share is $475 million which is the sum of the already contributed $150 million, the already committed $175 million and the new $150 million equity. DOE currently estimates the total project cost to be about $4 billion.

** "The original Clinch cost-sharing plan: a model ignored," submitted by Senator Gordon Humphrey to Congressional Record, Vol. 129, No. 114-Part II, August 4, 1983.

> "Rates of return on privately issued debt and equity will be higher than those which would be required on Federal debt. Private borrowing is always more costly than full Government financing since the Federal government necessarily commands the lowest borrowing cost provided by the marketplace."

We should not accept a plan that increases the total project costs without a reduction in risks, and that places CRBR under an off-budget entity which has serious pitfalls.**

WHAT IF THE PLAN DOES NOT WORK?

We have seen that the taxpayers are made worse off even if the plan works as envisioned by the task force. Worse yet, the plan can go wrong in a number of ways.

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* Letter from J. Dexter Peach, Director of General Accounting Office, to Senator Gordon J. Humphrey on August 22, 1983, entitled "Comments on a Plan for Obtaining Private Financing for the Clinch River Breeder Reactor."

**James T. Bennett and Thomas J. Dilorenzo, Underground Government: The Off-Budget Public Sector, Preface by Gordon Tullock and Epilogue by William Simon, CATO Institute, 1983.

The long-term borrowing of $1040 million in the plan relies critically on the revenues from the future electricity sales for repayment. It is far from clear that demand for this additional electricity will exist. In a Senate subcommittee hearing, William Willis, TVA's General Manager, said that "TVA is in no position to buy some or all the Clinch River Plant's capacity."* After all, TVA has deferred or cancelled eight of the seventeen nuclear power plants originally planned in the 1970's because of lower projection of electricity demand. And TVA has spent about $2.5 billion in these plants. In the same hearing, William Chandler of the Environmental Policy Center, who formerly had served as a consultant to the General Accounting Office on TVA's power programs, stated that "it is highly improbable that the Southeast region will need Clinch River power through the end of the century." Moreover, if the utilities project additional power demand, they would be more prudent to meet the demand by building additional coal-fire or nuclear plants instead of relying on a demonstrator which is like to have a high degree of unreliability in electricity production. Therefore, at best, the revenues required for the plan are highly uncertain.

Under the proposed plan, the Congress is expected to enact a one-time multi-year appropriation of $1.5 billion. Following the enactment, the Secretary of Energy will transfer the title of CRBR to a joint venture (CRBR Joint Venture) comprised of the Federal Government and a partnership of private investors, with shares of ownership in proportion to their respective investments. A new privately-financed business corporation, the American Energy Development Corporation which is being incorporated, will act on behalf of the partnership. If the cost history of light-water reactors and CRBR itself is any guide, cost overruns and construction delays on CRBR are likely. Already, based on the analysis of DOE cost estimate by the General Accounting Office,* one finds that the DOE's estimate of $2.4 billion as the remaining cost to complete CRBR can be too low by as much as a factor of two. By placing the project in an off-budget entity, the Congress is losing much of its control over the project. Particularly with a one-time appropriation, it would be much more difficult to stop the bleeding in the event that the costs or the risks of CRBR are getting out-of-control. There is a remarkable resemblance between the CRBR Joint Venture and Whoops, an apt nickname for the Washington Public Power Supply System (WPPSS). Both are off-budget entities intended to take the construction of nuclear power plants into their own hands. Both designers envisioned the need for their nuclear projects in the early 70's, at the peak of nuclear power optimism. Both entities rely on guarantees from public utilities and/or governments in selling their bonds and overestimated electricity revenues in repaying their debts. Both have incurred schedule delays and about six-fold increases in construction costs on their plants. Both are supported by leading investment banking firms. Why not? In the fall of 1981, Merrill Lynch underwrote an additional $750 million in WPPSS bonds and earned a $22.5 million commission--in its own estimation, the sale "may well have been the most profitable in our history."* The differences between the two off-budget entities are that Whoops has already caused the Pacific Northwest customers of the Bonneville Power Administration a 478 percent increase in wholesale electric rates during the last three years,** that it has created the largest municipal default ($2.25 billion) in U.S. history two months ago, that it has attracted an ever-growing number of lawsuits against nearly every involved party, and that it is likely to cause an increase in the borrowing cost for municipalities and states in the Pacific Northwest in particular and electric utilities in general. The only good news is that we do not have to create another monster, the CRBR Joint Venture.

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*See "Clinch River--Nobody wants to buy its power," submitted by Senator Gordon Humphrey, Congressional Record, Vol. 129, No. 54, April 26, 1983.

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*Report by the Comptroller General of the United States, "Analysis of the Department of Energy's Clinch River Breeder Reactor Cost Estimate," December 10, 1982. The interest allowance of $365 million associated with the bond issue in the proposed plan only corrects a small fraction of the $3.9 billion imputed interest which GAO claimed should be included. In the report, GAO also discussed a series of other cost underestimates and uncertainties associated with electricity revenues, plutonium fuel, operating and maintenance, contingency allowance and certain employee salaries.

SHOULD WE COST SHARE THE PROJECT AT ALL?

Let us now think about this more fundamental question. First, we need to remember that CRBR is a demonstrator of specific design. Based on DOE's own estimate, the plant capital cost of a matured breeder of the Clinch design will cost $1000/kwe more than that of a present-type light-water reactor (LWR).* With fuel cycle costs typically used by the nuclear industry, I calculated the breakeven uranium price between a mature breeder and a current and unimproved LWR in once-through mode (LWR(OT)) to be $270 per pound of uranium oxide. The breakeven price with an improved LWR(OT) is about 25 percent higher. Again, using the uranium price projection prepared by the Oak Ridge National Laboratory for DOE's investigation of alternative financing,** I found that a mature breeder will not be economically competitive even with an unimproved LWR(OT) until the year 2050. It should be emphasized that this determination is based on costs and projections made by DOE and the nuclear industry. The message should be clear--it is premature to demonstrate a breeder design which will not lead to an economic breeder for some seventy years.*** Why should we continue to support the CRBR just because someone is willing to lend us some initial capital? Worse yet, once we are fully committed to fund CRBR, we will be asked to support other projects associated with its fuel cycle activities such as plutonium reprocessing and fuel fabrication. The breeder proponents will use the same argument, but it will be even more forceful. They will say that all these activities are the necessary elements of a breeder demonstration program and, without federal support, the billions of dollars we have invested thus far would be wasted.

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* Peter W. Bernstein, "A nuclear fiasco shakes the bond market," Fortune, February 22, 1982, pp. 100-115.

**David L. Shapiro, "Whoops and the Hodel Connection," Wall Street Journal, May 20, 1983.

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* Energy Information Administration, Department of Energy, 1980 Report to Congress, Volume 3: Forecasts, p. 287. The capital costs of LMFBR and LWR have been converted to Fourth Quarter 1982 dollars and normalized to a capacity factor of 65 percent as assumed in the Second Report of the Breeder Reactor Corporation Task Force, p. 17.

** J. G. Delene, G. R. Smolen and H. I. Bowers, Engineering Economic Analysis of Utility Alternatives to the Clinch River Breeder Reactor, Prepared by Oak Ridge National Laboratory for the Department of Energy, March 1, 1983, p. 23.

***For more discussion of breeder economics, see Brian G. Chow, "Why we should not fund the Clinch River Breeder Reactor, Congressional Record, Vol. 128, No. 122, September 15, 1982.

If the nuclear industry and the utilities envision breeders to be economical sooner, they should assume the full ownership and the costs of CRBR. After all, the costs and risks of Fermi-I breeder in the 1960s were assumed by the private sector. And at the beginning, it was expected that the CRBR demonstration project would be financed and owned by a utility, or group of utilities, and that the government's assistance would be strictly limited as to type and amount.*

In sum, this off-budget financing and management scheme in fact will increase both costs and risks to the taxpayers of an already dubious project. It opens the door to a "Whoops" disaster at the federal level.

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*Congressional Research Service, The Library of Congress, "Private Sector Participation in the CRBR Project," Congressional Record, Vol. 129, No. 114--Part II, August 4, 1983.

Mr. Young. Thank you very much, Dr. Chow.

I'm sure that earlier this question would have asked by one of my colleagues, Doctor, so I think I'll ask it anyway. Why don't reactor manufacturers such as Westinghouse put up more risk capital in the project, Dr. Yasinsky?

Mr. Yasinsky. Well, I don't know of anybody in this country, any industry in this country, who invests risk capital in a—in a R&D project of this type whose benefits will accrue to the entire Nation decades and decades into the future. The magnitude of this energy technology and its cost are such that it's totally inappropriate to consider what usually are near-term venture capital investments.

As a participant in this program and a contractor, Westinghouse has and is continuing to make contributions to the project.

Mr. Young. Thank you.

The last question. At least from your company's involvement and perspective, do you believe the proposed funding plan will provide adequate dollars to complete this project, and that this will be the last time Congress would have to appropriate funds for the CRBR?

Mr. Yasinsky. Based on our analysis of the situation, if the funding is provided, given the advance state of the project, it is our belief that the project can be completed on schedule and within cost.

Mr. Young. Thank you.

A question for Dr. Chow. All the other industrialized nations—France, Britain, West Germany, Russia, Japan—are proceeding on a fast track program as their highest priority energy development program. Are you, in effect, proposing that the United States opt out of the breeder development and demonstration? Why?

Mr. Chow. Well, basically, those breeder R&D and development programs were envisioned a long time ago when, at that time, the nuclear power projection was very high and they expect the breeder will come in very soon.

Now, facing the—the situation now, they already slowed down their program to go into commercialization. So I think the United States should take a leap in pursuing things that are more economical and more beneficial to our energy picture.

Mr. Young. The last question would be, you have apparently determined that the year 2050, at which a mature breeder will become economically competitive, differs from earlier calculations and the Department's own estimates. Isn't predicting the future largely guesswork, and if you remain confident in your latter day of need for the breeder, what have all these experts done wrong that are predicting we're going to need a lot faster?

Mr. Chow. Well, I think the problem that we are facing is we are not quite talking about we have the breeder now or we don't have the breeder for the next 70 years. We are making sequential decisions. And the fundamental fact is what the breeder does is to save on fuel costs—OK, that's a fact—considering we don't worry about reprocessing costs and preparation costs. But the uranium is a very small component of the nuclear power costs. Even when the uranium price goes up to $200 per pound, the uranium cost is only like 10 percent. And now it's only $20, and you think the Department of Energy's own projection the uranium price will only be like $100 by 2020.

So what I'm trying to say is even though if we guess wrong, what we do is we just pay a high uranium cost, which is a very small percentage. So we are not really insuring against tremendous risks.

I'm curious that, in the past, Westinghouse or Department of Energy, they love to—to project the benefits of the breeder. In fact, I still remember the picture in the cost-benefit analysis of 1974. They tried to stack up old coins and see how high it will get. I always wondered at it's stacked so high whether it will fall or not.

So the point I'm trying to make here is that I would like—it would have been better if they quantified what kind of risks are we insuring against. Are we paying $99 for a $100 policy? Certainly I don't think we have time to go into that today.

Mr. YOUNG. Thank you very much.

Mr. Brown.

Mr. BROWN. Thank you, Mr. Chairman.

I want to express my particular appreciation to you two gentlemen for your patience and for the contribution that you made this afternoon.

I have a little problem with this debate because I have somewhat mixed emotions about the whole project, and sometimes don't see it in quite the same stark terms that others do. But I am deeply concerned that we make the right decision here.

Dr. Yasinsky, your company is one of the major actors in the nuclear business, both light-water reactors and Clinch River. Could you, for the record, indicate how much your company's involved as a supplier in Clinch River?

Mr. YASINSKY. The rule that Westinghouse plays in Clinch River is as the lead reactor manufacturer.

Mr. BROWN. Yes.

Mr. YASINSKY. Which means that we are responsible basically for managing the overall design of the nuclear steam supply system and the procurement of the components. Throughout the term of the project, General Electric and Atomics International Division of Rockwell have been subcontractors to us and essentially worked with us as a team in this area.

Mr. BROWN. What dollar figure are we talking about?

Mr. YASINSKY. The dollar involvement here has varied from year to year. I don't know exactly what it is this year. It has been decreasing over the last several years.

Mr. BROWN. Accumulatively, you have a rough guess? I'm just—I'm not trying to make a criminal out of you or anything.

Mr. YASINSKY. I—cumulatively, I don't have it, no. I can provide it if you'd like.

[The information follows:]

Of the total costs of the Clinch River Breeder Reactor Project, Westinghouse is expected to sell a total of $639 million in goods and services of which $399 million has already been sold.

Mr. BROWN. I understand that your company's earned about $50 million as your management fee. Is that somewhere close to right?

Mr. YASINSKY. As far as my understanding, that sounds very, very high. But, again, I don't have those figures with me.

Mr. BROWN. You don't stand to lose any money if this project is canceled, do you? You get the full value of all your contracts?

Mr. YASINSKY. If the project is canceled, we basically lay off the people we have and we're not participating in it. I don't understand your question.

Mr. BROWN. Well, insofar as you are a provider of equipment or a manager of a team that provides equipment, which I understand the contracts for the equipment have practically all been let, you will fulfill those contracts, you'll be paid for them, you'll earn a profit on it, you will not suffer financial loss?

Mr. YASINSKY. Well, my organization is involved primarily in the design and procurement area. And basically, if we look on a loss, we—as I indicated, we had been and are continuing to make contributions as part of our commitment to the contract. Certainly we will make contributions with nothing to show for it. Our loss would be small compared to the taxpayers' total loss of approximately $1.9 billion.

Mr. BROWN. Correct.

Are you also contributing to this additional capitalization that is being proposed under this new financing scheme?

Mr. YASINSKY. We've indicated that we would consider, once the program is put in place, we would consider this along with other investments that the corporation considers.

Mr. BROWN. You don't consider this to be a risky investment, do you? This proposed new financing plan, in your opinion, does not represent—or does it represent additional risk-taking by private industry?

Mr. YASINSKY. Are you asking me this from the point of view of the country in general or Westinghouse or——

Mr. BROWN. No. I'm asking you from the standpoint of an investor, if you are to invest in it under the conditions.

Mr. YASINSKY. The—the—the question of risk has been discussed continuously today, and we have seen that there is some element of risk. It is not a risk as large as you would have in many investments. And, again, we have to go back to the fact we're talking about a research and development project, demonstration part of R&D, never intended to be a commercial facility. The plan that has been put together which we think is the best plan that could have been put together was a direct response to the request of Congress, as you know.

Mr. BROWN. Well, since I made that request, I have some judgment as to whether the response is responsive for additional sharing in the risks of the project.

You're also involved in the light water industry substantially, aren't you?

Mr. YASINSKY. Westinghouse is. I am not personally.

Mr. BROWN. Your company is. Have you had any contracts canceled recently?

Mr. YASINSKY. I'm not aware.

Mr. YOUNG. Go ahead, George.

Mr. BROWN. If you were aware of any Westinghouse contracts being canceled, would you feel that you ought to ask that they be continued because the country may need the energy some day?

Mr. YASINSKY. We're talking about commercial powerplants under existing commercial contracts, which I consider to be totally different than a research and development program which was put together under contractual arrangements between the U.S. Government and participating utilities. So I really don't see the similarity in the two situations.

Mr. **Brown**. I thought I'd have difficulty getting you to see the similarity. But I—one of the arguments made here is that we're so far along in this that we ought to—we ought to go ahead with the project, even if we don't need the electricity, and if the R&D need that it doesn't exist for another 50 years.

And I wondered if your company would make that same kind of an argument, say, when TVA canceled a plant that you were involved in constructing?

Mr. **Yasinsky**. I don't think our stockholders would appreciate that kind of action. Again, this is a totally different situation. We're talking about a program that is a step along the way of commercialization, one for which benefits will accrue to the entire country, not to any particular firm or group of firms.

Mr. **Brown**. Well, the question of the benefits that will accrue varies in the eye of the beholder. There are a number of people who think there is no benefit from putting money into something that isn't needed at the present time and diverting it from something that is needed at the present time.

Let me ask you another speculative question with regard to financing. Do you generally favor off-budget financing for major Federal projects?

Mr. **Yasinsky**. Do I generally favor off-budget financing for——

Mr. **Brown**. Major Federal projects.

Mr. **Yasinsky**. I'm not an expert in that area. I don't feel that I can offer an expert opinion.

Mr. **Brown**. Well, this hearing is extensively focused on the question of the adequacy of this proposed new financing plan. And the major contribution of that plan is to reduce the Federal budget by making the cost off budget. It doesn't reduce the cost or increase the risk of private—of the private industry. But it does take it off budget.

Mr. **Yasinsky**. We do share the concern that, where possible, over the next several years, it would be advantageous to reduce the deficit. To the degree that we have a plan such as this that can reduce the deficit to spending over the next several years, I think it is advantageous, and I certainly do support that.

Mr. **Brown**. Well, what if it didn't? What if the plant did not go ahead and the Federal Government, after getting into this, had to make good on all these guarantees? That would come out of the budget.

Mr. **Yasinsky**. The——

Mr. **Brown**. It would add to the deficit at that point.

Mr. **Yasinsky**. The first point is the probability of that happening at this point is very, very small.

Mr. **Brown**. I wouldn't gamble on it.

Mr. **Yasinsky**. Even the advanced state of the project that has been discussed by many of the testifiers today.

And certainly there would be an element of risk there and the Government would be bearing part of that risk.

Mr. **Brown**. All of that risk. There isn't any part that the private industry bears.

I have no further questions, Mr. Chairman.

Mr. YOUNG. Dr. Chow and Dr. Yasinsky, on behalf of the committee, we thank you very much for your appearance today.

If there is no other business to come before the committee—we'll hold the—without objection, hold the record open for a translation of the report as an annex to Ambassador Hermes' written statement.

[Report retained in committee files.]

[The prepared statement of Ambassador Hermes follows:]

THE AMBASSADOR
OF THE FEDERAL REPUBLIC OF GERMANY

September 13, 1983

The Honorable
Marilyn Lloyd
Chairman, Subcommittee on
Energy Research and Production
U.S. House of Representatives
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mrs. Chairman:

I should like to thank you for the invitation to explain the breeder reactor development program of my country before the Subcommittee on Energy Research and Production.

The Government of the Federal Republic of Germany is observing the efforts of the U.S. Congress and the U.S. Federal Administration concerning breeder reactor development with great interest and welcomes the opportunity to share German experiences and views on this subject.

I therefore transmit the attached written statement answering the questions outlined in your letter.

Sincerely yours,

Peter Hermes

Peter Hermes

Encl.

PROGRAMME FOR THE DEVELOPMENT OF FAST-BREEDER REACTORS IN THE FEDERAL REPUBLIC OF GERMANY

I.

The Breeder Programme of the Federal Republic of Germany is divided into two main spheres:

- Installation and entry into service of the SNR 300 Prototype Nuclear Power Station near Kalkar, Lower Rhine, equipped with a sodium-cooled fast reactor (rated power 280 MW electrical). The SNR 300 fast breeder was ordered in 1972 and at the present rate of progress will start operations in 1985.
- The Fast Breeder Research and Development Programme, within the scope of which both research and development work associated with the building of the SNR 300 and work on further developing the breeder reactor series are being carried out.

The development of breeder reactor power stations is embedded in the Federal Government's overall energy policy, as was stated in the 1973 Energy Programme of the Federal Government and subsequent updates. The Federal Government regards the series of breeder reactors as an important means of ensuring the long-term peaceful use of nuclear energy and contributing to an ecologically beneficial

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energy supply. Breeder reactors, particularly the construction and operation of the SNR 300, are subject to very strict authorization procedures. Under the system security and protection of the public and employees are given priority.

Since the beginning of the seventies a vigorous debate has been going on in the Federal Republic of Germany over the pros and cons of the SNR 300 construction. This debate focused less on technical than on socio-political questions. In 1978 the German Bundestag made a reservation against the start-up of the SNR 300, which it withdrew after thorough discussion in a commission of enquiry into matters concerning future nuclear energy policy. On this occasion the Bundestag expressly stated that there were no political objections to the SNR 300 beginning operations.

The financing of the SNR 300 which has long been a problem is now assured. In 1983, on the basis of a financial contribution from energy suppliers and industrial enterprises, the Federal Government consented to the completion of the SNR 300 and set aside in the budget the substantial funds needed. As a basis for the decision of the Federal Government on the continued financing of the SNR 300, the Federal Minister for Research and Technology submitted a report on the state and prospects of advanced high-temperature and breeder reactor series. An important feature of this report, which also contains an outline of the SNR 300 Programme, is its comprehensive discussion of the pros and cons of breeder development in general. The report is enclosed as an Annex, but is only available in German.

II.

Since its earliest stage of development, breeder reactor technology has been developed in close cooperation with other countries, particularly with members of the European Community. The Governments of Belgium and The Netherlands as well as electricity suppliers and manufacturing firms from those countries are participating in the financing and production of the SNR 300. Particularly close cooperation with France is taking place in the further development of the breeder reactor series. There is German participation in Super-Phenix and there is a financing agreement among energy suppliers from France, Italy and the Federal Republic of Germany for the planned German SNR 2. Research and development programmes in the five countries referred to above are constantly coordinated.

In full agreement with the Williamsburg Declaration on Economic Recovery, these countries are currently extending their cooperation.

On September 5, 1983, the Government of the United Kingdom decided "to open formal negotiations to seek agreement on joint development of fast reactors with France, Germany, Italy, Belgium and The Netherlands".

III.

On the question of the importance attached by the Federal Government to the Clinch River Breeder Reactor (CRBR) Programme with regard to non-proliferation or other international goals, our comments are as follows:

Again and again there have emerged from the United States breeder programmes and their findings valuable new ideas and approaches which also benefit development work in other countries. The experience gained in construction and operation of the CRBR will also be of value to other countries which are pursuing breeder development programmes.

Larger-scale breeder development programmes are presently being implemented only in highly advanced industrial states. In view of the worldwide reduction in plans for the development of nuclear energy and the fact that a great deal of time-consuming work must be accomplished before breeder reactor technology can be used economically, countries which have not so far taken part in breeder development cannot be expected to be induced by the CRBR Programme to initiate their own breeder development.

Neither does the CRBR Programme create a new situation as regards the non-proliferation issue, especially since smaller breeder reactors were already, or are now, in operation in the United States. Furthermore, INFCE recognized the need for the use of breeders in idustrial states and stated that no reactor type or fuel cycle presented any special proliferation problem where safeguards were applied. This is all the more true since the western countries with the larger breeder programmes (Belgium, France, the Federal Republic of Germany, Italy, Japan, The Netherlands and the United Kingdom) are allied and linked by treaties and agreements with the United States. The statement of July 16, 1981, by the President of the United States also refers to these countries.

In 1954 the Federal Republic of Germany renounced her right to produce nuclear weapons. Since 1957 she has been a member of the European Atomic Energy Community (EURATOM) and since 1975 a party to the Non-Proliferation Treaty. Accordingly, in all peaceful nuclear activities in the Federal Republic of Germany all source and special fissionable material is subject to twofold international safeguards. In this context, attention is drawn to Item 6 of the Declaration made by the Federal Government of Germany on depositing the instrument of ratification of the Non-Proliferation Treaty. In its Declaration, the Government of the Federal Republic of Germany emphasized the crucial importance attached by it to the application of safeguards in nuclear plants devoted to peaceful purposes in nuclear-weapon states. Since the IAEA first applied safeguards in the U.S., it has also been possible to subject the CRBR Programme to safeguards within the scope of the voluntary offer.

Mr. YOUNG. If there is no other business to come before the committee, the committee will stand adjourned.

[Whereupon, at 4:40 p.m., the subcommittee was adjourned.]

APPENDIX

Department of Energy
Washington, D.C. 20585

September 27, 1983

Ms. Nancy Jeffery
Subcommittee on Energy Research
and Production
Committee on Science and Technology
House of Representatives
Washington, D.C. 20515

Dear Ms. Jeffery:

Enclosed is the edited transcript, with inserts, of Secretary Donald Paul Hodel's testimony on September 15, 1983, before the Energy and Commerce Subcommittee on Energy Research and Production concerning alternative financing for the Clinch River Breeder Reactor.

If you have any questions, please call Diana Diamond or Tom Pretorius of my staff on 252-4277. They will be happy to assist you.

Sincerely,

for Thomas H. Pretorius
Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosure

1/ On page 29 of Secretary Hodel's testimony, while discussing early cost estimates for the Clinch River Breeder Reactor project, the Secretary inadvertantly misquoted two figues. They were \$600 million and \$900 million respectively, and should be \$400 million and \$700 million. (This information was received telephonically by Nancy Jeffery and permission was requested from Mr. Tom Pretorious, Department of Energy).